

# THE IRON AGE

MAR 7 1918.

New York, March 7, 1918

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# War Materials

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# THE IRON AGE

New York, March 7, 1918

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## Utilize the Non-Essential Industries

Stimulate Essential Activities by Extending the List of Plants So Engaged, but Do Not Go to Curtailing Production

BY STERLING H. BUNNELL\*

GETTING hold of the right end of a problem may make its solution easy, instead of difficult or impossible. The industrial problem of to-day is the increase of production of everything necessary to win the war, and its corollary is the decrease of production of everything unnecessary to that end. Stated in this way, the proposition would have the hearty approval of every American, even though a manufacturer of "non-essentials." Unfortunately, newspaper headlines and Government proclamations have been stating the corollary as the main problem, confusing the issue. The apparent chief interest of every manufacturer thus becomes the finding of a reasonable excuse for considering his own particular industry as "essential" to the conduct of the war, and the object of the nation seems to be the decrease of production instead of its increase. Manufacturers seem to stand in the false position of opposing their selfish interests to the general good, while the Government urges patriotic sacrifices after the manner of "heatless Mondays," with idle machinery, discharged workmen looking for employment in unfamiliar surroundings, and organizations, valuable in the future commercial struggle, now broken up and dispersed beyond recall.

### Every Industry Finds Itself Necessary

Confronted with the proposal to limit production in non-essential industries, almost all manufacturers feel their interests injuriously affected. The tobacco, chewing-gum and candy trades state that their products go largely to the armies, therefore cannot be considered as other than essentials. Manufacturers producing expensive textiles claim that high-priced goods outwear cheap stuffs and so promote economy in the long run. Makers of jewelry and ornaments argue that the sale of their products causes the circulation of money

from the rich to the workers who will invest in war-loan securities and so provide funds for army and navy maintenance. Those who have no other excuse urge that their shops and special workers cease to be self-supporting and become an expense if forced by law to suspend operations. All these arguments are in the main perfectly true.

### Industrial Organization Must Not Be Disrupted

If the date of resumption of industries on a peace basis could be foreseen with certainty to be within a period of a few months it would be the part of wisdom to throw every available man, however inefficient, into war work and stop the action of every industry not instantly and directly assisting to win the war. On the contrary, we know that industry will never be resumed under the pre-war conditions, but under new and sharper competition, from our manufacturing Allies at first, and from our enemies as soon as trade is permitted to them. Winning the war is our first duty, but our work must not stop when that duty is done. We cannot, therefore, allow the disruption of our industrial organizations, and their complete replacement by Government works for war purposes only, to be disbanded and closed when their work is done;

### Basis for a Positive Rearrangement of Our Industries for Effective War Work

A CAREFULLY balanced apportionment of army and navy, civilian population, and vital export trade needs.

THE conservation and continuance of sufficient non-essential industries to satisfy the minimum requirements for insuring the contentment and efficiency of the people.

MAINTENANCE of foreign trade to safeguard necessary imports, and at same time economize on war materials by concentrating on the exportation of a maximum of non-essentials.

for that would leave us without the means of resuming our commercial occupations and earning our national living. We have to prepare for a long war, even though hoping for a short one, and so must balance carefully the requirements of army and navy, civilian population, and export trade both with countries whose products we need in return and with countries whose trade we desire to obtain and hold.

All these considerations tend to increase the number of industries to be considered as "essential" to the present national good. Those industries which remain as non-essential must still be treated with consideration. They represent capital which will be destroyed

\*Chief engineer R. Martens & Co., Inc., New York.



if work is stopped. They give employment to some at least who are not capable of working effectively in other trades more "essential." Finally, they have in stock quantities of valuable materials which may be entirely useless for munitions, army clothing or ship-building, while readily salable when made up. Feather boas, for instance, are perhaps as useless as anything that comes to mind, but it is better that the stocks of feathers in manufacturers' hands shall be made up (at trifling cost for labor) and sold to those who can pay for them, than that the materials should lie unused. In the one case the manufacturer and workers continue to earn their living and probably invest savings in war loans, while in the other case the investment might be made with part of the money not spent for feathers, but the manufacturer would be ruined and the workers thrown out of employment and forced to learn new trades.

#### The Place of the Non-Essential Industry

There is no possible objection to the operation of even non-essential industries to the extent that they do not use material, labor or equipment available in any way for essentials. It is not possible, however, to maintain this limit rigidly. A moderate amount of change of occupation, leisure, recreation, amusement and luxury must be permitted to every one, even soldiers in the field, if they are to maintain their best efficiency. For a day, week or month, sleep, leisure or recreation may be prevented through necessity, but not for the period of the war. The occasional high-minded ascetic can work for months or years with mind intense and physical force held to his task; but the mass of soldiers in the field and of citizens supporting the army by work at home must be given some latitude to do as they individually please. If this latitude permits the successful operation of recreation centers for the soldier abroad and theatres for the civilian working at home, it also affords a valid reason for permitting the continuation of non-essential industries to the amount justifiable to satisfy the average minimum requirements of the population for contentment and efficiency, and more if, as has been said, neither material nor labor, nor equipment, is thereby diverted from directly essential industries.

#### Non-Essentials for Trade Balance

Still further scope must be permitted to some industries not in any way directly useful to ourselves either for fighting, supplies, or necessary recreation. The United States is obliged to buy many commodities from other nations, and to pay for those purchases either in goods or gold. The supply of gold is limited, and it is necessary to avoid using it as currency to pay for purchases. The foreigner prefers to take his payment in goods, and if he will accept jewels, pianos and gramophones, and other luxuries, instead of demanding coal and iron, which we need for ourselves, it is good business to give him all the "non-essentials" he will take and to receive "essentials" in return. For the purposes of export and import trade we are forced to manufacture goods of non-essential character, even though we divert to that purpose some material and labor that might be otherwise used on products useful at home. For present as well as future necessities export trade must be maintained and promoted.

#### Non-Essential Plants Turn to War Work

On every account the situation is to be dealt with positively rather than negatively. How can production of essentials be promoted? How can essentials be produced by plants now making non-essentials, and what amount of non-essential industry shall be permitted for export trade, and to afford a reasonable minimum of recreation and relaxation at home? These are great national questions, on the solution of which many minds are working in Washington and in many

other cities not so conspicuous in the public eye. Hundreds of American manufacturers who perceived that their normal product was not directly useful to the conduct of the war have already pointed out their own solutions and received contracts for work adapted to their equipment and labor. Marine steam engines are being built by makers of heavy stationary engines, gas engines and refrigerating machines. Uniform cloths have taken the place of fancy woollens in textile outputs. Cotton manufacturers have worked on substitutes for silk fabrics, and silk weavers in their turn produce balloon and aeroplane coverings instead of dress goods. Watch factories build chronometers, compass and instrument parts, and torpedo mechanisms. Workers in precious stones are producing jewels for pivot bearings. Automobile part factories have made up new jigs and tools for producing motors and elements for military standard chassis. These and thousands of other modifications have already been made by co-operation between army and navy specialists and manufacturers of non-essential goods who naturally wanted to maintain their organizations and at the same time help to win the war. It is not to be supposed for a moment that by "maintaining their organizations" it is implied that these manufacturers withheld men from military or direct Government service; on the contrary, thousands of factory hands were permitted and encouraged to drop their jobs and enlist in the service of the country as trained mechanics or other specialists, and the members of the organization remaining successfully undertook the training of women and unskilled men to carry on the work.

#### Many Small Plants Left Out

There is still very much to be done in the same direction by other manufacturers. The fitting out of the American Army and Navy required enormous quantities of goods of all kinds. Only a small number of all the various articles wanted could be ordered at once from previous samples or from specifications furnished by our Allies in the war. As the unknown designs were gradually developed into promise of success the need for the articles became more urgent, and manufacture had to be started on an enormous scale. The result was that necessarily the big shops got the first orders; the problems could not be complicated by scattering the work about in small quantities. In this way many manufacturers who made generous and patriotic offers of their small plants for any kind of government use were unable to obtain orders of any kind. Most of these, of course, therefore kept on at their former "non-essential" work, and probably did what they could to help in raising funds for the Government as the Liberty loans were put on the market. Such men are naturally disturbed and probably aggrieved at any proposition to shut down their plants and stop their work indefinitely. Such a move should not be necessary.

Our Allies have had all the problems which confront us, and in more difficult form, and they have made their own solutions. Great Britain commandeered each available "non-essential" shop when work suited to its equipment was available, compensating the owners as arranged by law. If certain parts of the work in a large shop were being produced in insufficient quantities some small shop might be commandeered and the work put in there, or the original proprietors might be allowed to take a contract at a reasonable profit. Canada, having many small shops, made their problems her own and claims to have provided every manufacturer asking it with work on some portion of the enormous total of munitions to be turned out.

#### Some Priority Blundering

Priority orders have been used with good effect on the whole, but many absurd situations have been re-



ported. For instance, engines urgently wanted by one department were given first-degree priority, while crankshaft forgings requisitioned by the engine builder went via another department and were put down in fourth place, and it took several weeks of interviews to get the forgings advanced, during which time the engines had to wait. To arrange a schedule even for machine parts in a small shop requires much thought and good judgment, but when the schedule is expanded to the entire manufacturing plant of a great nation it becomes too large for any mind to grasp the details, and many errors must result.

Now that the greater needs of the army, navy and shipping have been standardized so that production is proceeding on a large scale in many plants, it should be possible to make an intelligent effort to provide for every manufacturer of non-essentials, work suited to his equipment and the skill of his employees; and to provide for every small shop, sub-contract work on details and parts for large orders which are being produced in other plants near by. While this is being done notification that non-essential industries are to be modified into essential industries will have the desired effect of inducing manufacturers to work up their stock on hand and put it on the market, and to present their cases to the authorities in charge of the readjustment so that suitable work may be found for their future activities. Time will thus be afforded for the needed changes, and the minimum loss will be caused, while the maximum benefit to the country's interests will result.

## TIN CONTROL BY MR. HOOVER

### A Bill for That Purpose Reported Favorably to the House

WASHINGTON, March 5.—The employment of a somewhat obscure phrase of half a dozen words in a bill just reported from the House Committee on Agriculture will result, if the bill is enacted, in placing the entire tin-plate industry under the direct control of the United States Food Administration. The bill in question has been framed by Director Herbert C. Hoover and will have behind it the full measure of the Administration's influence. The fact that it has been reported by the House committee after a short hearing accorded to Mr. Hoover is indicative of the intention of the Congressional leaders to pass the measure in a form entirely acceptable to the Food Administration and at the earliest practicable date. In a statement to the House committee Mr. Hoover says:

"There is an increased demand for tin for munition purposes and a greatly increased use of ration containers for these armies of some 12,000,000 men along the western front. They are eating to a large extent out of tin containers, and the amount of block tin available in the world is running short." At the present time, he added, the tin-plate manufacturers are co-operating in a voluntary arrangement, as are also the tin-container makers, but some trades which use large amounts of tin are still getting their material in spite of the fact that the supply for food containers is in danger. In this connection Mr. Hoover specified tobacco, toilet articles, etc.

From inquiries made here it is quite evident that Mr. Hoover's plan to secure control of the tin-plate industry is not generally understood. Certain Representatives and Senators who have looked into the matter, however, are disposed to object strongly to giving authority to the Food Administration or to any other Government agency interested in a single line of work to control so comprehensive an industry as that engaged in the manufacture of tin plate, or even that branch of it producing containers. The committee appointed by the Secretary of Commerce more than a year ago to supervise the distribution of tin

At a meeting of the New York Section of the American Society of Mechanical Engineers on Feb. 21 it was decided to recommend the appointment of a committee of the society to take up the question of the best utilization of non-essential industries, and to offer its co-operation with the authorities at Washington toward the best solution. There is no doubt that the assistance of such a committee would be welcomed, and that manufacturers working together could produce a better system of attaining the desired end than could be done by any man or men without actual experience in manufacturing affairs.

To win the war is impossible without hardship, even ruin and death. It is not to avoid hardship to the manufacturer and his organization that any should protest against the limitation of the work of any plant or industry; rather, it is to avoid reducing the output of the United States. We need every ounce of effort of every citizen. The authorities should never stop a man's work in one line without putting him instantly into another job more necessary. This condition is an ideal impossible of full attainment, but its attainment is worthy of a strong and continued effort. Let us think of the situation as needing, not the limitation of non-essential activities, but the stimulation of essential activities. In this way every plant and every organization available for any part of the essential work of the United States should be utilized, and then the few remaining non-essential industries can safely be left to take care of themselves.

plate and the allotment of imported pig tin has worked very efficiently and has been able to provide all food manufacturers with adequate supplies of containers. The amount of tin used for food packages probably exceeds that consumed by any industry employing it exclusively for containers, and, although food packers have from time to time become apprehensive regarding their supply, it is understood there has as yet been no noticeable shortage. In November, 1917, imports of tin aggregated 8,405,601 pounds, as against 5,078,610 pounds for the corresponding month of 1916.

Officials here have received inquiries as to whether it will not be practicable to secure a larger supply of tin from British sources during the coming year, in view of the extent to which tin plate will be used in the manufacture of containers for food to be shipped to the Allies as well as to the American forces in France. As has recently been pointed out in this correspondence, there was a substantial decrease in the amount of tin imported from the United Kingdom and Strait Settlements during 1917, which would have left a deficit as compared with 1916 but for the increase in receipts from the Dutch East Indies amounting to nearly 100 per cent. There is some reason to believe that the conditions emphasized by Mr. Hoover may result in the release by Great Britain of a larger quantity of tin to the United States to meet the special emergency contemplated in the supplemental Lever bill.

### Growth of the Krupp Steel Plant

The Krupp plant at Essen, Germany, continues to grow. As given in the German daily papers, the balance sheet of Fried. Krupp A. G., of Essen, for 1916-17, shows the value of the immovable property to amount to £12,192,000 after writing off £4,171,000 for depreciation, as compared with £12,081,000 and £2,757,000 respectively in the previous year. The directors point out that the increasing requirements of the army compelled the firm to erect further extensive buildings, the carrying out of which at present war rates is highly costly and consequently involved the firm in specially heavy expenditure last year. As a large portion of the buildings will only be completed in the current financial year, further considerable expenditure will be incurred this year also.

# Making Cast Ammunition in France\*

## How Semi-Steel Shells Are Made— Composition and the Physical Prop- erties — Sand Lining for Cupolas

BY E. RONCERAY

THE war which has been engaging the attention of the civilized world for over three years has made necessary the introduction of new processes in the foundry as well as in other industries. The need for ammunition is great and exceeds what was conceived to be necessary, even by the most visionary. It is a well-known fact that five weeks after the declaration of war, the battle of the Marne ended when the French and Germans had practically exhausted their entire supply of shells. It was a tragic and critical moment and every means was resorted to to obtain shells, even though imperfect.

It was at this time that practice shells, made of cast iron and containing only a small amount of explosive, were used and these were produced as quickly as the foundries could turn them out. The 75-millimeter (2.96 in.) steel shell gave such excellent results that every effort was made to secure them and even small shops were asked to bore and thread steel bars to produce these shells in two parts, one for the body and one for the cap. This imperfect type of shell and that made of cast iron saved the day for the 75-mm. rapid fire gun which was the most important weapon in use at that time. Steps were taken immediately for the manufacture of forged shells on an extensive scale and the output at present is so great that we are furnishing large quantities of them to our allies.

A different problem was presented in providing shells for the large guns. With the increase in the diameter of the shells, manufacturing difficulties increased more rapidly. More time was required to make the large shells and to organize for their production in large quantities. It was then that the feasibility of using cast shells was seriously considered.

It is well known among ordnance experts that the destructive effect of a projectile increases in proportion to its size more rapidly than the weight of the explosive it contains. Therefore, steel had the preference for shells in spite of the great cost of the raw material and the high cost of machining. Cast iron shells used as substitutes for steel were of a small capacity on account of the great thickness of wall it was necessary to provide, to insure adequate resistance to the ballistic action of the powder.

### Semi-Steel Shells

The *fonte acierée*, that is, cast material and what is known as semi-steel, was considered and was selected finally for producing a comparatively cheap, quickly manufactured and reasonably effective shell. The Germans can vouch for this. Since the beginning of 1915, an enormous number of these projectiles from 80 to 400 mm. (3.15 to 15.71 in.) have been made and fired for the cause of civilization. In addition to the semi-steel shells, an enormous amount of grenades and projectiles of all kinds have been made of cast iron in France.

The metal required for semi-steel shells was defined by the following data, based on the tests made in this country by the ordnance authorities and railroad companies. The test piece is a square bar, 40 x 40 x 200 mm. (1.57 x 1.57 x 7.85 in.) long, cast on end in green sand with a riser. It is tested on two knives spaced 160 mm. (6.30 in.) apart, by a falling weight of 12 kg. (26.41 lb.). The initial drop is from a height of 28 cm. (11 in.) and the weight is raised 1 cm. (0.254 in.) after each blow until rupture occurs. The average breaking height must not be less than 45 cm. (17.71 in.).

The tensile test piece is 18 mm. (0.71-in.) in dia-

meter x 150 mm. (5.91 in.) long, cast on end and turned down to 16 mm. (0.63 in.). The breaking strain must not be less than 25 kg. per sq. mm. (39,900 lb. per sq. in.).

Hydraulic tests of 10 sec. duration, before banding, are made at a pressure of 300 kg. per sq. cm. (4500 lb. per sq. in.) for the shells up to 160 mm. (6.30 in.) and 200 kg. (3000 lb. per sq. in.) for the larger sizes. Other tests after banding are made with compressed air or steam at 5 kg. per sq. mm. (75 lb. per sq. in.).

A reasonable allowance is made for small defects difficult to eliminate entirely in practice, particularly when a great production is required. Small defects are passed externally in front of the band provided their thickness can be determined exactly with a needle and extend into the metal less than one-fourth of the wall thickness.

No defects are permitted at the back of the band except small, interior depressions due to imperfect coring, provided that the thickness is not more than 2 or 3 mm. (0.079 to 0.118-in.) and that the bottom of the shell is sound.

### Composition of the Metal

No definite analysis is enforced provided the physical tests are satisfactory. In fact, the metal is a low phosphorus, low sulphur and low carbon iron with a sufficiently high amount of silicon and a sufficiently low amount of manganese to leave it soft under the conditions of pouring. Typical analyses of semi-steel shells follow:

	Diameter of Shell 150 mm. (4.74 in.). Per Cent	Diameter of Shell 155 mm. (6.11 in.). Per Cent
Total carbon .....	3.25	3.06
Silicon .....	1.34	1.17
Manganese .....	0.66	0.61
Phosphorus .....	0.08	0.08
Sulphur .....	0.10	0.17

To obtain a very strong metal it may be melted either in an open-hearth or electric furnace, which insures a low carbon product with some degree of certainty, or by mixing cupola and converter metal. Thermic treatment will considerably improve the physical qualities. Tensile strengths of 35 to 40 kg. per sq. mm. (50,000 to 57,000 lb. per sq. in.) have been obtained regularly by these processes. This metal, however, increases the casting difficulties as it has a tendency to develop blowholes owing to its lack of fluidity. However, for the heavy tonnages required in a short time, the cupola, well handled, gives satisfactory results and regularly produces metal that passes the necessary physical tests. The bulk of the semi-steel shells made in France, either for the Allies, or for ourselves, have been cast of cupola metal.

### The Cupola and Its Equipment

The standard cupola, as built in America, is capable of producing good semi-steel. The tuyeres, usually one or two rows close to each other in large cupolas, must be of the standard type, that is, flat and one-sixth to one-fourth of the section of the cupola. It is advantageous to employ a cupola, equipped either with a hearth for holding a certain amount of metal, or provided with a receiver. The use of a receiving ladle is not recommended, as very hot metal with regularity of composition is essential. If a cupola equipped with a receiver is employed, provision must be made to heat the receiver white hot before pouring, or the first metal will be dull.

A blower of ample size is required and it is more

\*From a paper prepared for the American Foundrymen's Association. The author is a member of the association and lives at 9 Rue des Envierges, Paris, France.



advisable to have one of too large a capacity than one that must be driven to the limit to provide sufficient blast. I prefer a positive pressure blower to a fan, as the former insures better control of the melting.

#### Sand Lining for the Cupola

The best lining is none too good as all operating conditions are against its long life. The extended heats necessitated by the large outputs required, the exceedingly hot temperature needed for good metal, the large amount of coke burnt at each melt combined with its low quality at the present time and the large amount of limestone generally used, result in the rapid wear of the lining. Owing to the high cost and scarcity of refractory material in France, many foundrymen have adopted sand linings and it must be admitted that in a great many instances these linings have given equal, if not better results, than refractory brick. A good refractory sand is selected for this purpose and it should be rammed hard between the shell of the cupola and a wood form. It is then carefully dried and blacked. In wearing qualities it compares favorably with the best refractory brick. A thick lining, 12 in. or more, is recommended.

The proportion of steel used in the mixture depends on the composition of the initial iron. If low carbon irons are employed, the amount of steel added must be less than if high carbon pig is used in the mixture. As a rule, the hematite irons now supplied contain more carbon than required, cold blast iron with low carbon content not being produced here in large quantities. Therefore, it is necessary to add a large amount of steel to the charges in order to reduce carbon in the final product. It is admitted that in the cupola process, steel before melting, absorbs 1.6 to 2 per cent of carbon. Taking this into account it is easy to calculate how much steel must be added to reduce the carbon percentage to the correct point. In French practice, up to 40 and even 50 per cent of steel is used. The amount generally charged, however, is from 15 to 30 per cent, according to the quality of the initial iron.

#### Composition of the Final Product

The final product varies for different sizes of shells and according to the methods of molding pursued. The shell casting must be softer for the smaller projectile, or more exactly, for the thinner shell, and also it must be softer when the metal is poured in green sand molds than in dry sand. The physical properties of the test bars do not measure the final quality of the product. Therefore, test bars from the projectiles themselves are necessary. Such tests, together with actual firing practice, have shown that the best results are obtained when at least 20 per cent of the total carbon is in the combined form, this percentage being as high as consistent with the possibility of machining the shells. The total carbon is kept at about 3 per cent. Less than 2.75 per cent gives a sluggish metal which is difficult to handle and liable to produce unsound castings. Above 3.25 per cent carbon results in the production of castings that are too weak.

Several methods are pursued for controlling the combined carbon. One is to alter the amount of silicon; another is to change the amount of manganese which seems to act in opposition to the silicon, and a third is to change the speed of cooling. Silicon precipitates carbon in the graphitic form and, consequently, reduces combined carbon; manganese has a reverse action, while combined carbon increases with the speed of cooling.

Since the amount of manganese in the iron and steel we are using is about right, it has not been the practice to vary their percentages according to the silicon content. The speed of cooling is not easy to control and the only consideration given this factor is in connection with the change that takes place when the thickness of the shell is varied or the adoption of dry, or green sand molding methods. Silicon is the element most easily controlled and it is due to its control that semisteel shell manufacture has been successful in this country.

To arrive at the minimum amount of silicon accept-

able, a test is made under the usual working conditions of the plant and the shells that are slightly hardened at the point are analyzed. These will contain the lowest admissible silicon percentage.

#### Rule for Fixing Silicon Content

Experience has shown that to obtain a sufficiently strong metal, the empirical rule

$$T. C. + Si = 4.50$$

must be satisfied. This is the maximum amount of silicon. For instance, if total carbon is 2.80 per cent then  $Si = 4.50 - 2.80 = 1.70$  per cent. If total carbon is 3.10 per cent then  $Si = 4.50 - 3.10 = 1.40$  per cent.

The amount of silicon must be kept between the limits of 1.40 and 1.70 per cent, the one corresponding to the minimum of silicon giving the maximum resistance permitted without having chilled castings or shells that are too hard and the other corresponding to the maximum of silicon, above which the castings would be too weak. Care must be exercised to have these figures refer to the final product and, therefore, provision must be made for silicon losses in the cupola.

In working between these limits, analyses made of the actual castings will show that the percentage of combined carbon will be more than 20 per cent of the total carbon necessary to give a satisfactory shell metal. If this figure is not attained, the physical test will not be satisfactory and the shells, when tested will be shattered into small splinters, similar to dust, whereas when 20 per cent or more of combined carbon is obtained, the splinters will be larger and will be more like those of forged steel shells.

Regarding the other elements, phosphorus and sulphur must be kept as low as possible, but it may be stated that satisfactory shells can be made with as much as 0.15 per cent phosphorus and 0.12 to 0.15 per cent sulphur. Phosphorus reduces the strength, but increases the fluidity. Sulphur is without much effect on the strength, but it reduces the fluidity and retains carbon in the combined form. Its action is counterbalanced by the manganese. Sulphur, however, has a tendency to produce blowholes when the metal is not poured at high temperatures and when the mold is not gated to prevent the entrance of air into the mold with the iron.

#### The Chemical Composition and Physical Tests

Maximum resistance to shock must not be sought, or the tensile strength will not be satisfactory. It must be remembered that a sample giving a high shock resistance will fail in the tensile test, and vice versa. A test bar, breaking under a high falling weight, undoubtedly reveals sluggish iron liable to produce blowholes and to chill at thin points. The tensile test probably will not be satisfactory. Under these circumstances, reasonable limits must be fixed in both directions and the rules outlined will enable this result to be obtained.

If a high figure for the falling test and a low tensile test are obtained, silicon must be added.

If the tensile test is high and the falling test too low, carbon must be reduced.

Steel and ferrosilicon, or high silicon iron, are the two agents that will best serve the metallurgist, care being exercised to take into account possible variations in the initial metals used.

#### Frequent Analyses and Rapid Tests

It is helpful, of course, to analyze the initial and final products. Though it is difficult to rely entirely upon the regularity of the materials received, it must be admitted that analyses, properly made, are important. All materials should be analyzed, especially iron, scrap, coke, limestone, sand, core oil and finished castings. After a short time these analyses will provide a certain amount of fixed data which will enable the metallurgist to handle with a greater degree of certainty the factors that are liable to change from day to day. For instance, phosphorus, sulphur and manganese will remain about the same for each brand of iron, sulphur for each brand of coke, and limestone and sand do not vary much if received from one source.



Silicon loss and carbon gain in the cupola will not change much if the same practice is followed every day.

Other factors, on the other hand, are liable to constant changes; these include silicon in pig metal, moisture in the sand, composition of the core oil, etc. Therefore, analyses must be made as frequently as seems necessary under the circumstances, always keeping in mind that it is a practical impossibility to work only from analyses, particularly on account of the irregularity of the materials.

Either Keep's or a chill test should be made constantly to determine roughly if the amount of silicon is right. If not the iron may be pigged and a part of the loss recovered, or the iron can be improved by additions in the ladle, or changes in the subsequent cupola charges. It is the prevailing practice to add powdered ferrosilicon in the ladle when the iron is too hard.

It also may be necessary, when the product is too variable, to pig a certain amount of metal, for instance, to prepare a low carbon metal from hematite iron and a large percentage of steel to use instead of scrap. If this metal is analyzed it makes more certain obtaining a satisfactory final product. Some firms knowingly increase their amount of foundry scrap of known composition by making the risers much larger than is really necessary. These processes increase the regularity of the work, but at a heavy expense in time and money and they must only be resorted to when all other means have failed.

A useful, rapid test consists of taking a sample of metal every half hour and pouring it against a chill. The sample is plunged into water when set and is broken immediately. An experienced eye can tell quickly the depth of chill that gives the right metal for the needs of the foundry. This depth is not the same for all classes of shells; it must be less for small, or thin projectiles, than for heavy ones. I prefer this to another test recommended by the ordnance department, which consists of pouring cones into open sand molds from time to time, and after cooling the points are broken off for the purpose of ascertaining from the fracture if the metal is right.

#### Operation of the Cupola

The operation of the cupola is similar to that for ordinary work. However, the amount of coke used is somewhat more than the usual average, but not so much as might be imagined. It is generally from 12 to 15 per cent of the charges and this is essential on account of the necessity of having metal much hotter than is obtained usually, if sound castings are to be made. It must be borne in mind that a blowhole which would be unimportant in a machinery casting would not be passed in a shell. Also, it must be remembered that a certain amount of carbon is absorbed by the steel charged before it melts.

Some foundries are using up to 20 per cent coke, but the writer considers this bad practice, as satisfactory results are obtained with a smaller amount. However, in spite of the high price of coke, foundries must not be tempted to reduce its consumption to less than that necessary to obtain the best results. Good shells are obtained regularly when the temperature of the iron at the cupola spout is about 1450 deg. C. and it must never be less than 1250 deg. C. when entering the mold. Unfortunately, there are few practical methods of readily measuring the temperature of a stream of iron.

#### Rules for Charging

In charging the cupola, the rules laid down by Richard Moldenke may be followed. However, it has been found that better results have been obtained by increasing both coke and iron charges by 50 to 100 per cent over what he recommends. That means that coke charges are 6 to 8 in. high and iron charges in proportion. Different methods are followed for charging limestone and variations in the amounts used also prevail. With the poor grade of coke now furnished in this country, containing from 16 to 18 per cent of ash, some foundries use up to 12 per cent limestone and

add it to all charges, including the bed. This means that charging 12 per cent coke, as much limestone as coke is used. Other foundries use two and one-half times as much limestone as ash in the coke. Good results are obtained with 5 to 6 per cent of lime. Good limestone contains about 50 per cent lime.

The pig iron should be broken into small pieces, but it is still more important to use steel in small rather than large pieces, as the action of cementation takes place before liquefaction takes some time and would not be completed if the pieces are too large.

#### Income Tax on a Mathematical Basis

Carl G. Barth, consulting management engineer, addressed the Philadelphia section of the American Society of Mechanical Engineers on Tuesday evening, Feb. 26, on the income tax, pointing out inconsistencies of the law, including recent amendments, and declaring himself to be strongly in favor of taxing incomes upon a formula of mathematical progression rather than upon the present system of jumps, which he called the "block method."

Mr. Barth has, it appears, given considerable time and thought to improvement of the method of levying income taxes throughout the world. His findings have been presented to tax experts of the Treasury Department, and, he said, had been passed upon as representing an ideal system of income taxation, but one which Congress would be slow in adopting. He said that Congress was not made up of mathematicians, or its members would quickly see the superior advantages of the graduated method, which, he emphasized, political economists regard as the logical solution of the problem of taxing incomes.

In practice, Mr. Barth's method, as applied to the estimated incomes of all persons in the United States, would produce an annual revenue of about \$504,000,000. He begins with incomes as small as \$342, but said that in actual practice \$500 might be accepted as a beginning, because this figure is small enough to include all wage earners whose incomes are sufficient to justify levying upon. While he admitted that the cost of collection of taxes upon small incomes might be greater than the monies derived, he thought the principle of direct taxation of incomes should be applied to all incomes if taxation is to be truly socialistic.

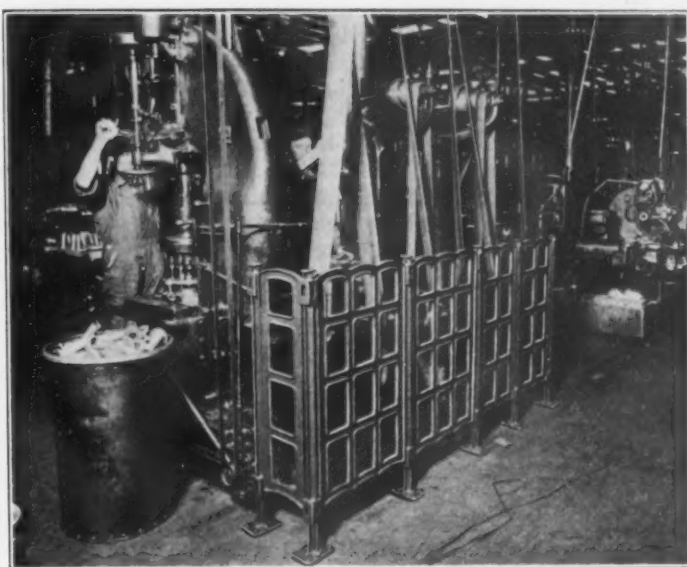
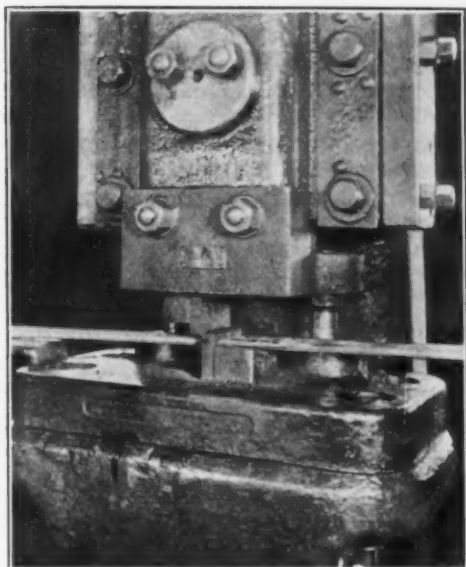
By a series of charts Mr. Barth showed how his plan of taxation would work out. The results, in the aggregate, would be very much the same as under the existing law, but there would not be the present variation in the taxes levied upon two men, one on one side of a jump in the tax rate and the other on the other side. The tax on a \$500 income would be, say, 60 cents per year, while on a \$20,000,000 income the Government would derive two-thirds, but the intervening steps would not be covered in a series of irregular jumps but on a straight upward-trending line or smooth curve.

#### Fertilizers Under Federal Control

Sulphate of ammonia, produced by by-product coke ovens, blast furnace dust and other ingredients of fertilizers have been placed under Government regulation by order of President Wilson. A licensing plan has been adopted.

Unusual activity exists at the shipyards of the Mitsubishi Engine & Dockyard Co. of Nagasaki and Kobe, says the *East and West News*, which adds: "In addition to eight merchantmen, ranging from 6000 to 8000 tons each, to be completed before July, and for which ample steel is already in Japanese storehouses, plans are making to build submarines on a scale never before contemplated. Dr. K. Ito, an expert engineer, will have charge of this new department organized solely for the creation of the most approved types of under-sea craft. If necessary, a portion of these boats will be turned over to the Allies."

The Sections of Shearing Dies for Presses Are Always in Contact thus Preventing Accidents and Not Interfering with Production. The Sectional Guard Rail at the Right Can Be Readily Set Up or Taken Down and Removed to Another Location as Often as Is Desired



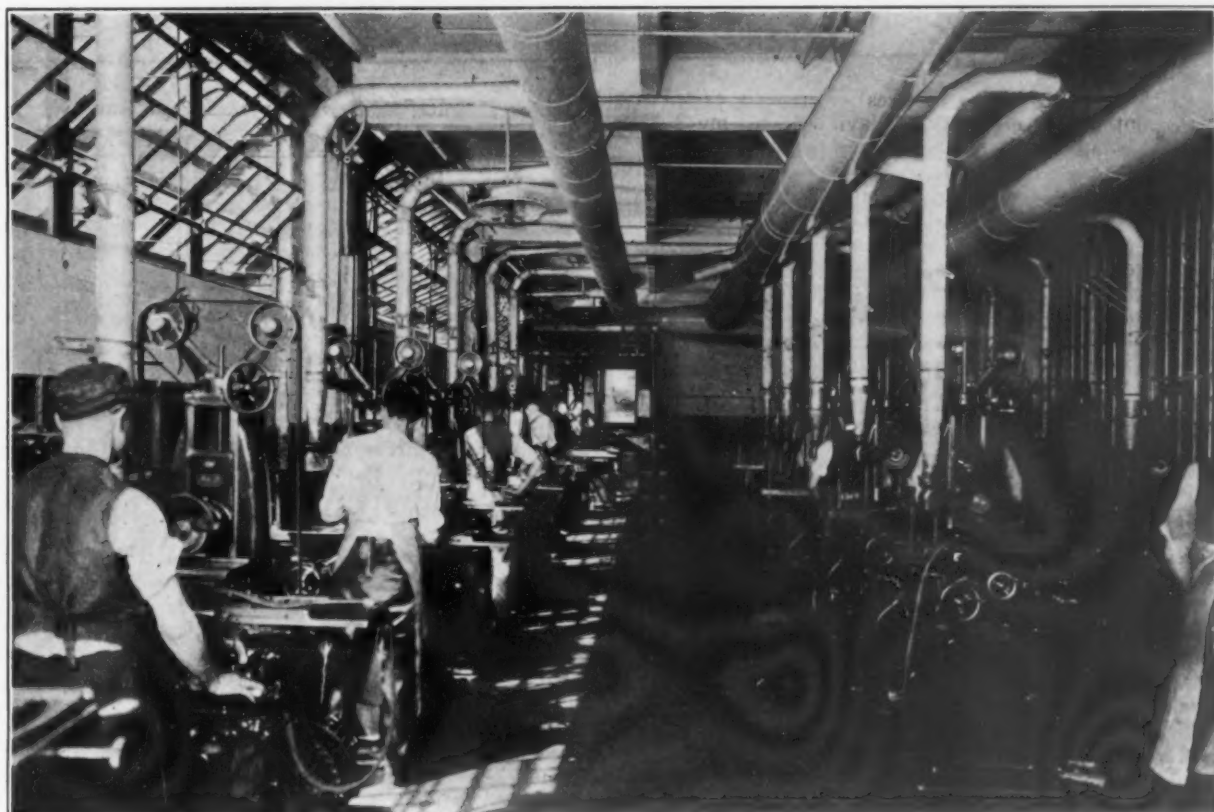
## Safeguarding the Automobile Worker

A Semi-Portable Sectional Rail Guard  
and Other Accident-Prevention Arrange-  
ments Developed by the Ford Motor Co.

**T**O prevent accidents to workers, some interesting devices have recently been developed by the Ford Motor Co. and are in use throughout the plant at Detroit. These include guards for presses and polishing machines, a special arrangement for freeing the air in the tool-grinding room from dust and a semi-portable sectional rail guard for use

around pulleys and similarly exposed revolving parts.

The guard was developed by one of the employees and consists of a number of posts and a series of identical sections which are supported by them to give the desired protection. One of the reasons leading to the development of this particu-



The Machines in One of the Tool Grinding Rooms Have Individual Driving Motors and Each Wheel Has an Iron Hood Connected to the Exhaust System Through a Ball or Universal Joint



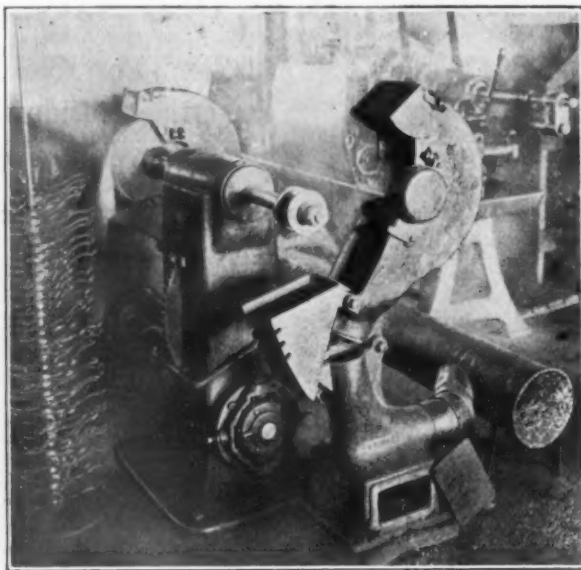
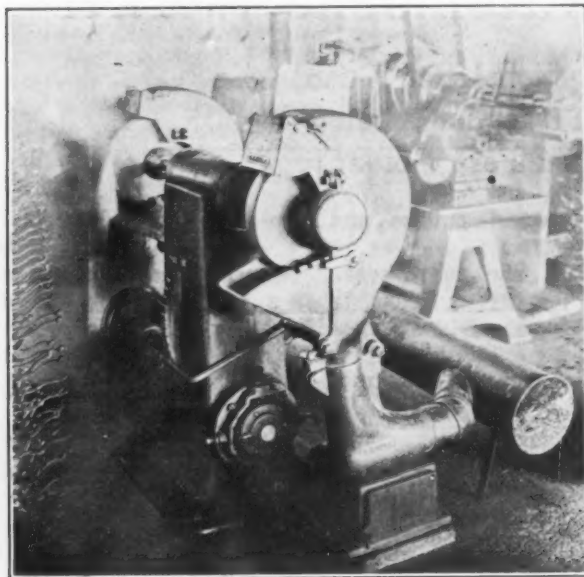
lar guard was that it can be readily installed, thus eliminating the hazard of unguarded pulleys, since the guard may be placed at the time the machine is set up and work begun without waiting for a permanent guard to be built. The posts are fastened to the floor with screws, or nails may be used if the installation is only a temporary one, and the sections are hooked in place in the same manner as the members of a metal bedstead are put together. If one or more of the sections should become broken at any time it is possible to remelt the pieces and make new sections there being practically no interference with the output of the machine while this is being done since a new section can be readily slipped into place. When the permanent guard that was especially designed for a location is received, it can be substituted for the sectional rail which is available for use in some other portion of the plant.

The guard which was especially designed for polishing stands can readily be adjusted to any desired position to cover the wheel, the manipulation of a single thumb nut being all that is required to make the change. The end nut of the spindle is protected by a hinged cap and a clean-out box is provided at the bottom of the guard where the larger particles produced by the grinding operation

accumulate. In this way these are not drawn through the suction fan forming a part of the exhaust system to which the guard is connected and the amount of wear on the fan is reduced. All of the sections of the guard are interchangeable thus enabling the wheel at either end of the stand to be protected.

In one of the tool-grinding rooms of the plant the machines are driven by individual motors, provision is made for plenty of outside light and air and in addition washed air is blown into the room. Each grinding wheel has an iron hood over it which is connected to the exhaust system through a ball or universal joint. In this way close adjustment to the wheel and the maximum of flexibility are secured and practically every particle of the emery and iron dust produced by the grinding operation is removed.

In the arrangement employed for rendering the shearing dies of presses safe the two sections of the die are always in contact. Thus it is impossible for the operator to get his fingers between the parts of the die and injure them, and this safeguarding of the dies, too, is accomplished without interfering in any way with the production of the machine.



A Specially Designed Guard for Polishing Wheels Can Be Quickly Adjusted to Any Position by Manipulating a Single Thumb Nut and the End Nut of the Spindle Is Covered by a Hinged Cap

### The New Steel Plant in Normandy

A recent bulletin of the Chamber of Commerce of Caen, Normandy, gives particulars of the new steel plant near Caen. There are at present at Mondeville-Colombelle, as the site of the new works near Caen is known, four batteries of 42 coke ovens each, producing 1000 tons of coke a day. Two other batteries came into operation and brought the output up to 1500 tons a day, or 500,000 tons a year. The blast furnaces, the first of which has been blown in, are about 95 ft. high and can produce 400 tons a day. Each furnace has five Cowper stoves, and the whole installation will allow an output of 450,000 tons of pig iron a year. The steel works contain four 30-ton converters and five open-hearth furnaces, giving an output of 275,000 tons of basic Bessemer steel and 125,000 tons of open-hearth steel every year. The blooming mill can deal with 500,000 tons of ingots a year. The company already has large reserves of iron ore.

A large engine room, 650 ft. long, contains two turbo-alternators of 3000 kw., one of 5000, and six gas engines of 6000 hp. The private harbor on the Orne canal is now ready for vessels of 2000 tons, but in time

will be open to boats of 8000 tons capacity. Thus far 30 fresh grants have been made for exploiting the iron ore deposits in Normandy, Brittany and Anjou, and the French Government is preparing to work the Littry coal fields between Saint-Lo and Bayeux.

### German Chromium Steel for Permanent Magnets

In the report of the German Imperial Physico-Technical Institute for 1916 it is stated that 37 alloy steels with varying contents of carbon and chromium have been experimented upon, and a substitute for tungsten steel has been found for making magnets, as all the available tungsten had been commandeered by the German Government for war purposes. Though not so good as are the best tungsten steels for the purpose, the chromium steel selected has given satisfactory results equal to those of the more common tungsten steels.

[As long ago as two years, a highly satisfactory permanent magnet steel was being made in the United States—a chromium alloy steel, instead of tungsten steel. It was described in THE IRON AGE, July 26, 1917.]



# Great Housing Plan for Workingmen

Employees of Shipyards and Other War Industries  
Will Be Cared For—Special Bureau Created—  
Cost-Plus Contracts Prohibited by One Bill

WASHINGTON, March 5.—A gigantic labor housing project involving the expenditure of a round hundred million dollars is provided for in a bill passed by both houses and soon to be approved by the President, and a second measure which has just been introduced by Representative Clark of Florida, chairman of the House Committee on Public Buildings and Grounds. The measure about to become a law carries \$50,000,000 for the housing of labor employed in the shipyards of the country, while the Clark bill appropriates a like sum to be expended in building homes for workmen employed in other war industries. The enactment of these two bills, it is believed, will solve the most serious problem that has confronted the Government in speeding up the war program and will make it practicable to provide an ample labor supply for every industrial concern working on a Government contract.

## Shipbuilding Retarded

The difficulty of housing labor has greatly retarded the development of the shipbuilding program of the Emergency Fleet Corporation, and lack of shelter for the workers employed in the various yards has slowed down shipbuilding operations to a very serious extent. The temporary character of the work—for it is not to be expected that shipbuilding will long be maintained on the present scale after the war is over—has made it impracticable for the owners of the private yards to make the necessary investment in housing for their numerous employees, but failure to do so has greatly increased the current labor turn-over and has also had a demoralizing influence upon the wage problem. Thousands of workmen have been attracted by promises of high wages to plants without living accommodations, and when this fact has been ascertained, they have drifted away to other places in search of jobs in localities where homes could be secured. Yards badly located with respect to housing have been obliged to offset this disadvantage by increased wage scales, and in many cases to make daily allowances for the cost of transporting their men for considerable distances to and from their work.

## Special Bureau Created

To meet these conditions the United States Shipping Board framed the measure just passed by Congress carrying \$50,000,000 to be spent under the direction of a special bureau created for the purpose. The system to be employed for the disbursement of this big appropriation has been carefully worked out with a view to standardizing methods as completely as possible and for the special purpose of providing a maximum of salvage to the Government when the present emergency has passed. Under the plan as approved, it will not be the policy of the Government to requisition land, nor to take title thereto, nor to appear as owner or lessee of any development or subdivision. The shipbuilding company in each case will be expected to contribute the land or the value of the land free and clear of all incumbrances and to organize a subsidiary "realty and construction company" whose charter shall be approved by the Emergency Fleet Corporation and whose capital stock shall not exceed the actual cash paid for the land to be improved, or, if the land be already owned, then the actual cash value thereof at the commencement of the operation. The shipbuilding company must convey such lands to the realty and construction company with full warranty of title. The funds necessary for the housing project will be advanced by the Emergency Fleet Corporation upon a bond and mortgage executed by the subsidiary realty and construction company to the shipbuilding company and assigned to the fleet corporation.

The building plans of the Emergency Fleet Corporation have not yet been worked out in detail, but contemplate a variety of structures specially suited to locality, climate and other conditions surrounding each particular shipyard. While in certain cases barracks or dormitories will probably be used for the housing of considerable numbers of men without families, great pains will be taken, especially in larger projects, to provide attractive homes for married men, and in the case of large yards which promise to be permanent after the war the buildings and surroundings will be of a character to induce workmen to purchase them on easy terms.

## Variety of Buildings

The housing project contemplates community improvements, such as schools, churches, parks, etc., and the Emergency Fleet Corporation will maintain a strict control of all business establishments that may be located within the housing areas in order to prevent the exploitation of the workmen. So-called company stores will be strictly supervised and their books will be required to be open to inspection at all times.

The officials of the Fleet Corporation have already conferred with the responsible officers of a considerable number of shipbuilding companies needing housing facilities and have received assurances that the project as outlined above will be satisfactory and that it will prove in all respects practicable. The housing act, however, clothes the Fleet Corporation with a large measure of discretion, which will enable it to modify the proposed system from time to time as special conditions or experience may dictate. The appropriation provided by Congress will be disbursed under the personal supervision of J. Rogers Flannery, director of housing, who will maintain headquarters with the Emergency Fleet Corporation in this city.

## Other Industries

The housing project for other war industries than shipbuilding, as provided by the Clark bill, is necessarily much more flexible than the plan devised by the Emergency Fleet Corporation. Providing accommodations for workmen in a great variety of manufacturing establishments, it contemplates taking care of organizations ranging from a very few men up to the largest force employed by any single concern engaged on a Government contract. The Clark bill, therefore, clothes the Secretary of Labor with the broadest possible powers in the expenditure of the housing appropriation. He is authorized to enter into any arrangement or contract through any agency he may create and in anticipation of the enactment of this measure he has already organized a special bureau, at the head of which will be Otto Eidlitz, a New York architect and builder. Mr. Eidlitz was chairman of the subcommittee on housing of the Council of National Defense and as chief of the new bureau will have control of all the Government's activities in providing living accommodations for industrial workers outside the shipbuilders.

The very unsatisfactory experiences of the Government under so-called cost-plus-profit contracts are officially recognized for the first time by Congress in the framing of the Clark bill which contains the provision that "no work or contract done or made under or by authority of any provision of this Act shall be done or made on or under a percentage or 'cost-plus' basis."

The Mahr Mfg. Co., builder of oil burning furnaces, has moved its offices to 1300 Quincy Street, N. E., Minneapolis, Minn.

# Application of Heat in Steel Treating\*

## Principles of Generation by Electricity, Gas, Oil or Powdered Coal —Special Furnace for Forgings

BY A. F. MAC FARLAND

THE primary considerations in the heat treatment of steel are the generation of heat and its subsequent application to the metal undergoing treatment. The fundamental principles involved, as exemplified by some of the methods in use at the present time, are touched on only.

### Ideal Conditions Not Obtainable

Ideal heat treating conditions would be realized if we were able to transmit simultaneously to each molecule of steel a certain given amount of heat in a certain given time. This, however, in practice is not attainable for reasons that appear obvious upon consideration of the inherent properties of steel, particularly, specific conductivity. As an illustration of this ideal situation, assuming that we have a solid sphere of steel suspended by some means in a hollow spherical muffle, which is heated uniformly all over, the ideal is approached, obviously, as the size of the steel sphere decreases. In an effort to approach as nearly as possible to the ideal in heat treating, fuel and furnace engineers have brought out a vast number of burners and furnaces of various types and designs, many of which are on the market at the present time.

In industrial heating there is no general solution as to what to use as a heating element and what sort of furnace to use it in. No single type of furnace, fuel or system is applicable to all problems. Quality of product and cost of manufacture are the basis on which the selection of the method of heat treatment should be determined. Obviously, it would not be feasible from a practical standpoint to treat 18-lb. high explosive shells in small electric furnaces nor would it be advisable to treat small steel balls in a gas furnace with a 6 x 4-ft. hearth. Each class of work calls for its own special arrangement for heat treating, hence we have such great variety in furnace design and such varied methods of heat generation.

The following is a short table of fuels commonly used for heat treating, with their relative heating value and cost. Electricity has been classed here as a fuel, inasmuch as this paper deals with it primarily as a means of heat generation. The figures for fuel oil, city gas and electricity are based on recent prices; however, it is not desired that any of these computations be taken authoritatively, for in these days of fluctuating prices the computations of to-day are entirely upset by to-morrow's quotations

	Price Basis	B.t.u. Basis	No. B.t.u. for 1c.
Electricity .....	0.01 per kw.-hr.....	3,412	3,412
Gas			
City gas .....	0.75 per 1000 cu. ft....	600	8,000
Natural gas ...	0.50 per 1000 cu. ft....	950	19,000
Producer gas ..	0.10 per 1000 cu. ft....	145	14,500
Oil			
Crude .....	0.075 per gal.....	146,000	19,466
Kerosene .....	0.140 per gal.....	132,000	9,429
Coal			
Bituminous ....	9.50 per ton.....	14,000	20,473

Note buying power of 1 cent in B.t.u.

A great many mistakes have been made in selecting a fuel from a chart of this nature. It is true that these figures represent accurately the calorific value of fuels, determined by careful experiment in the laboratory. However, the actual calorific power obtained in practice depends entirely upon the method of burning the fuel. For example, the old style oil burner of the forge shop will not give the calorific value from one gallon of oil that the recently perfected vaporizing

system for burning oil will give. The general manager of one of the most progressive drop forge plants in this country told me that he had cut his oil bill in half by replacing the old style burners with this improved system.

### Means of Heat Generation

The means used for the generation of heat also bears an important relation to the quality of product. A fuel which carries a considerable percentage of sulphur has a deleterious effect on steel when the products of combustion come in contact with the metal. Oxidizing atmospheres in the furnace cause excessive scaling and sometimes troublesome decarbonization of steel surfaces. The ease with which furnace atmospheres are able to be maintained depends largely upon the flexibility of the medium of heat generation. By flexibility is meant the ease with which the fuel lends itself to producing either oxidizing or reducing atmospheres in the furnace. Gas and oil are more easily controlled in this respect than coal or coke, depending somewhat on the facilities of burning them, while electricity is an ideal heating medium for producing neutral atmospheres.

I hardened a number of small parts a short time ago in an electric furnace. To my surprise, after quenching the parts from 1500 deg. Fahr., not one of them showed the least particle of scale or oxidation. We investigated the matter immediately and found that a new piece of insulating brick placed in the furnace was responsible for the phenomenon, as it contained a substance, which produced a strongly reducing atmosphere in the furnace. This phenomenon should prove of interest to some manufacturer who is treating parts where even the thinnest scale is undesirable.

The cheapest fuel on a strictly B.t.u. or calorific basis is not often the cheapest fuel for heat treating steel when all the factors which have a distinct influence on the subject are taken into consideration. There is always a right fuel for the particular heat treating operation at hand and each problem should be thoroughly studied and understood if the best solution is to be had.

In heat generation and application the human element plays a very important part. The manufacturer who invests in expensive furnaces and fuel equipment makes a grave mistake if he fails at the same time to invest in a suitable amount of brains to operate this equipment for him efficiently. Fool-proof heat-treating equipment is still a thing of the future, although considerable progress along the lines of automatic temperature control has been made, resulting in various appliances which tend to minimize the difficulties encountered, especially on very large installations where uniformity is as important as the enormous production.

Furnace builders up to the past few years, with a few possible exceptions, seem to have been in a dormant state. While pyrometry, metallography and other related branches of heat treating were making rapid progress the furnace men were apparently mentally asleep and it is only until comparatively recent years that they have been awakened to the crying need of better furnaces. With this awakening has come the electric furnace, new systems for burning oil, gas and coal and the basing of recent furnace design by the enterprising furnace companies on sound scientific principles.

The following may be enlightening to those of you who are in the market for additional equipment. But long years ago one of my friends called me in to look at a new furnace he had purchased which was not giving the results anticipated. After I had listened to the

\*From a paper read before the Chicago section of the Steel Treating Research Society, Jan. 14, 1918. The author is metallurgist of the U. S. Ball Bearing Mfg. Co., Chicago.



unkind remarks he made about all furnaces in general and this furnace in particular, we went out to talk to the foreman of the heat-treating room and to look the furnace over. The furnace was all right for some oper-

conduction through the surrounding air and by direct conduction from the hearth, while in the cylindrical type of furnace the heat is transmitted from all sides of the piece by radiation and by conduction through the atmosphere of the furnace. Another advantage is the facility for handling material in the cylindrical furnaces on jigs. In naming these advantages I have based my deductions on prevalent practice, so do not misconstrue these statements as being meant to cover special cases where the hearth muffle type of furnace may have an advantage over other types. There are also special types of wire wound electric furnaces designed for special jobs.

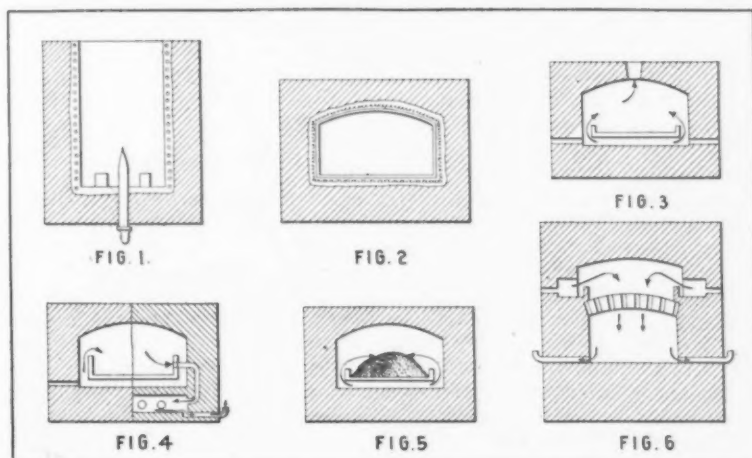
#### Gas and Oil Furnaces

Gas and oil furnaces are, perhaps, the most widely used for commercial heat treatment. A discussion of the multitudinous designs in detail would, obviously, entail a great amount of time, so I will confine my remarks to short discussions of a few of the designs in common usage and will endeavor to outline briefly some of their advantages and disadvantages.

First, there is a simple underfired furnace which is being used at the present time for a large number of heat-treating operations.

The combustion takes place below the hearth and the hot gases, products of the combustion, pass around the sides of the hearth into the heating chamber. Obviously, the edges of the hearth will heat first, and stock placed in the furnace if placed near the edge of the hearth will heat locally in the place which is nearest the edge. This can be overcome to some extent by building up the sides of the hearth as in Fig. 3. This arrangement automatically stops any overloading at the sides of the furnace and tends to prevent cutting action of the gases near the hearth line of the furnace. There is no need to build these sides beyond a certain height for, once properly guided, the hot gases by nature will continue in an upward direction to the roof of the furnace.

As to the location of the vents in this furnace, you would probably be amused if I were to ask whether or not you open your attic windows in the winter time when you are trying to heat your house. Why not apply the same common sense in heating steel and keep the vents out of the roof of the furnace. The heat in this furnace is transferred to the stock by the hot gases, the products of combustion. The stock also receives



Figs. 1 to 6—Various Methods of Applying Heat in Furnaces for Heat Treating Steel

ations, but was not designed for the work for which it was purchased. My friend told me it was guaranteed. I asked him if he had it in writing and he proudly produced the contract, which read that the furnace was guaranteed to heat uniformly. I told him the real test of a furnace from the standpoint of a uniformly heated product is not the temperature variation when the heating chamber is empty, but the temperature variation around the material to be heated when the chamber is loaded to full capacity. It is not extremely difficult to build a furnace whose special requirements are those referred to above.

#### Electric Heat-Treating Furnaces

Electric furnaces used in commercial heat treating may be roughly classed under two heads.

Wire wound furnaces, where the resistance material consists of wire, usually composed of an alloy of nickel and chromium, and useful for temperatures up to about 1800 deg. Fahr. These furnaces range in size from small laboratory furnaces to muffle furnaces with chamber dimensions of 24 x 24 x 48 in.

Carbon resistance furnaces where the resistance material is carbon. Small furnaces of this type may be used for relatively high temperatures and are suitable for treating high-speed steel and even for melting a quantity of brass. Larger furnaces have been built for steel treating, although I am not in a position to say whether they are highly successful or not.

The construction of the wire wound furnaces is very simple and the heating elements are easily manufactured if one is able to obtain the necessary materials for their construction. There are two general types of wire wound electric furnaces which are used to quite a large extent for relatively small work. One type may be called the cylindrical or "Pot" type, illustrated by Fig. 1, and the other the ordinary hearth muffle type, as shown in Fig. 2. In the ordinary hearth muffle furnaces the work usually rests on the hearth, while in the cylindrical furnaces the work is usually suspended on jigs or by wires.

When the product being treated requires the utmost care as to rate of heating and uniformity of temperature the cylindrical type of electric furnace in my opinion is the ideal furnace to use. The advantage this furnace exhibits over the ordinary hearth muffle furnace lies in the method of placing the work in the furnace. The work in the hearth muffle furnace resting on the hearth receives heat from three walls of the muffle by radiation and by

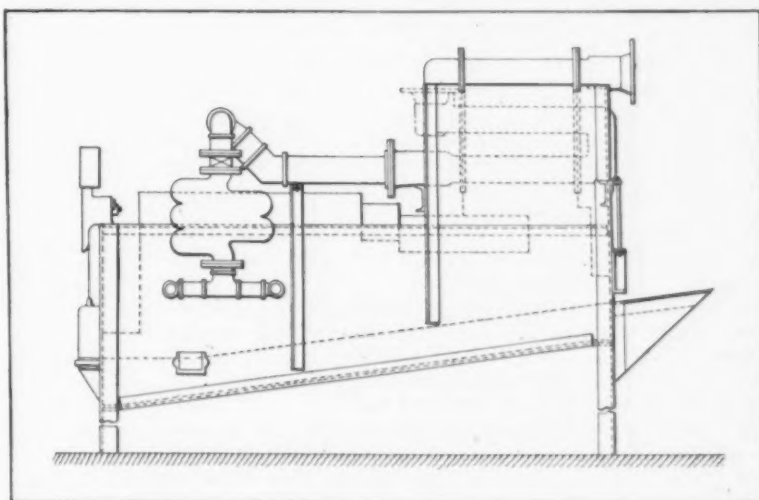


Fig. 7—A Continuous Forging Furnace for Drop Forgings

heat by radiation from the walls and arch of the furnace and by conduction from the hearth on which the stock rests.

Instead of wasting the heat from the products of



combustion, which pass off into the atmosphere as shown in Fig. 3, at a temperature near that of the furnace temperature, we transmit some of this heat to the stock and furthermore preheat the air for combustion to about 600 to 800 deg. Fahr., thereby saving the gas which would be required to heat the air in actual combustion.

#### Furnace Capacity and Overloading

In connection with furnace design, mention of furnace capacity and overloading is opportune. Suppose, for instance, we have a carbonizing furnace as illustrated by Fig. 4, with side walls 8 in. high on the hearth and a height of 20 in. from the hearth level to the arch. This furnace should not be loaded with carbonizing boxes 16 in. high, resting flat on the hearth and crowded closely together, if good work is desired. The tops of the boxes will, obviously, heat first, as the gases have not sufficient space in which to circulate around all sides of the box and to impart to each side and bottom an equal amount of heat. If it is desired to carbonize in this furnace good results could be obtained by using small boxes about 10 in. high, leaving a space of about 6 in. between the boxes, and raising the boxes off the hearth a couple of inches to give the hot gases a chance to perform their function.

As another instance, let us consider a number of small bolts treated in the same type of furnace. The bolts have been thrown in a pile on the hearth as shown in Fig. 5. The bolts on the outside of the pile obviously heat up first and when they are ready to quench the inner portion is still relatively cold. If you wish to melt a dish of orange ice uniformly and rapidly you will spread it in a thin layer over the plate. The same common-sense principle applies to steel treating. Overloading furnace chambers in heat treatment is a common thing in these days of maximum production and not a little trouble may be directly traceable to it.

Over-fired furnaces also have their adherents and much has been said of their good and bad qualities. Fig. 6 represents one type of over-fired furnace utilizing a perforated arch. This furnace is adaptable to low charges. When the charges are high there is a tendency to overheat the top. The gases, due to the peculiar construction of the perforated arch, necessarily enter the chamber at a relatively high velocity which is liable to cause decarbonization with high charges. However, the most undesirable feature, to my mind, in the over-fired furnace is the cold hearth. This argument also hits the over-fired car type furnace in common usage. The upkeep of the perforated arches usually runs into considerable expense which is another decided disadvantage. The distinct advantage possessed by car type furnaces lies in the facilities they offer for handling material.

#### Powdered Coal Ash Fuel

I will not go into the design of coal-fired furnaces on account of the fact that they are rapidly being replaced by equipment using oil or gas. However, I believe powdered coal could be used to distinct advantage in some heat treating operations. Powdered coal burning is in its infancy, we might say, at present and although it has been used in cement kilns and other places for a number of years, in my opinion it promises to become of considerable importance in other lines of work.

A few words relative to forging furnaces seem opportune before concluding. It seems to have been a prevalent idea that any manner of heating device would suffice for bringing steel to the proper (or improper) temperature for forging, and in many cases the bricklayer was placed on his own initiative in the matter of furnace design and construction. While this attitude was quite complimentary to the bricklayer and while he must have individually profited by his experience in this line of work, there is a considerable doubt in my mind as to whether this practice proved the best for all concerned. For good forging practice a uniform temperature throughout the bar to be forged is essential. With heavy sections the tendency has been toward quick "wash heats," which often result in a cold core

of metal. I have seen a "dripping" heat exhibiting this cold core in the center of a bar when it was placed upon the hammer. On the other hand, long soaking heats at a high temperature are undesirable from a metallurgical standpoint. The stock should be brought up evenly to the correct temperature and then forged. Furnaces using a flame blasting against the stock, whether gas or oil fired, are bad. It is evident that these furnaces will not produce an even heat throughout the charge of the furnace, as the stock lying near the tip of the flame will be hotter than that nearest the burner.

#### Special Furnace for Forgings

Fig. 7 is a sketch of a continuous forging furnace which has proved very satisfactory in drop forge work. The combustion takes place above the stock near the discharge end of the furnace. This, obviously, is the hottest part of the furnace. The stock resting upon the level portion of the hearth is allowed to soak at the forging temperature a very short time before removing to the hammer. The hot gases pass back to the charging or rear end of the furnace and through a system of preheaters located on top of the furnace. While this furnace is over-fired it is free from most of the disadvantages named, due to its particular design. This same design of furnace is being used to a very great extent in this country for shell forging and has proven very efficient. It is equipped with a vaporizing system for oil, which uses only 40 per cent of the fuel oil necessary for the same heating operation in other furnaces.

I realize the incompleteness of this paper in relation to the subject at hand. But I have tried only to express my own views, based on practical experience.

#### Thermal and Electric Conductivity of Carbon Steels

Dr. Carl Benedicks in 1902 proposed a numerical relation between the electric resistance of steels and their composition, his equation being based on his own experiments, and expressing the conductivity as a function of the sum of percentages of dissolved carbon plus the sum of equivalent carbon values of all the other dissolved elements, says a writer in the *London Iron and Coal Trades Review*. His equation has been accepted within certain limits by other writers. But as regards the thermal conductivity of carbon steels in connection with their composition, according to Takeo Simidu, a Japanese author, hardly anything has been published. He therefore has made investigations to ascertain in what manner the amount of dissolved elements, especially carbon, affects the thermal conductivity of steels. The method and results of his investigation are published in the latest issue of the *Science Reports of the Tohoku University*. The thermal conductivity of steels, he finds, varies in the same manner as the electric conductivity and he gives three equations to calculate it for forged, annealed, or quenched steel, as the case may be. In a comparative table he gives the calculated and observed values for a dozen specimens of Krupp carbon steels for each of the three treatments and the discrepancies between theoreticals and actuals only range between +0.009 and -0.0012 gr. cal. per deg. cm. sec. Another table gives the ratios of the two conductivities, or the product of the thermal conductivity and the electric resistance.

#### Spanish Exports of Iron Ore

Exports of iron ore from Spain for the first nine months of 1917 were 4,425,225 tons, as compared with 4,401,106 tons in the same period in 1916, according to the *Revista Minera*. Exports of iron pyrites to Oct. 1, 1917, were 1,658,285 tons, as against 2,323,065 tons to Oct. 1, 1916—a large decline. Manganese ore exports had increased from 5611 tons to 17,519 tons in the same nine-month periods of 1916 and 1917 respectively. Imports of pig iron were only 11,866 tons to Oct. 1, 1917, as compared with 23,837 tons to Oct. 1, 1916.

# Standardized Form for Shop Sketches

An Arrangement That Enables Freehand Sketches to Be Made Easily and Quickly and Provides for Making Blueprints

BY P. A. SMITH\*

**S**KETCHES are frequently a source of annoyance around a plant, causing delay and expense. The forms shown were designed to overcome this situation and to standardize the making of sketches. Their size is 9¼ in. wide by 11 in. long. The original is of tough, thin stock and is section ruled into 1-in. squares by 0.1 in., which helps in making quick or freehand sketches. It is thin enough to permit making a clear blueprint. The duplicate and triplicate copies carry a detachable slip at the bottom, to be signed and returned. All copies are numbered alike and are punched at the edge for filing in a loose-leaf binder and perforated at the top for filing on an arch file.

The following is an outline of the use of the forms in various cases. Suppose a part of a lathe is broken. The departmental foreman makes a requisition for a new part with his report as to the cause of the break. The purchasing department receives this and has a sketch of the broken part made by the drafting room and two prints. The original is held by the drafting room; the duplicate is sent to the lathe manufacturer with the purchase order. This bears the number of the sketch, and the sketch bears the purchase order number. The manufacturer returns the numbered detachable slip with his acknowledgment of the order. The triplicate is filed with the unfilled purchase order where it can be quickly referred to by the buyer in correspondence or discussion. One of the prints goes to the receiving clerk, so that the part can be properly checked when received. The other print goes to the shop order clerk for his use and record. If the repair is an intricate one this clerk can obtain another print for the foreman who is to do the repair work. Thus all who have a part in requesting, buying, furnishing, receiving, recording and replacing the part have the necessary information at hand. When the order is completed the copy from the receiving clerk is filed by number, and, since the original is filed by name, a cross index is made. If a record of machine repairs is kept the number of the sketch is entered on it. This record will show if the same part is breaking frequently and a change in design or material may correct the fault or, perhaps, cause the machine to be scrapped.

Another use follows. Suppose new or experimental work requires the purchase of goods. Copies of the sketch are sent out with the inquiry for prices. When a decision is reached as to the vendor the course outlined above is followed. It is often found best not to give vendors all the information that your shop drawings would carry. If the seller requires more copies for the purpose of manufacture, etc., a turn of the blueprint machine supplies them.

If a customer wants something special made a

sketch is sent to him for approval. If acceptable and his order is received, as many copies as are required are sent to the shops for manufacture. If the customer's order is a complicated one, quick sketches of the matter pertinent to some one department can be made and the job started, as for instance sizes for foundry flasks, jig castings, etc.

Where the work is important enough we use tracings, but find many cases where these forms fill in to

The Ruled Original Furnishes a Convenient Means for Making Freehand Sketches Which Can Be Blueprinted if Desired, while the Duplicate and Triplicate Provide for an Acknowledgment of the Sketch by Other Departments Interested

advantage. The detachable slip traces delivery and places blame for tardiness. Where standard machines are used, one sketch can be used for many things.

## Shipyard Is Building Town for Workmen

The Merchant Shipbuilding Corporation, which is building a new shipyard at Bristol, Pa., is making rapid progress on the construction of buildings for housing its workmen. The Fred T. Ley Co., New York, contractor, has erected a large number of barracks and private dwellings and more are being built. The town will include barracks for 1800 unmarried men, 50 apartment buildings that will house 1000 small families and 500 separate group houses for 1500 other families and 400 single houses for the larger families. These buildings will accommodate 3000 workmen, and these, with their families, will make up a town of about 10,000 population. About 3000 other employees of the shipyard will be housed elsewhere. The housing facilities will be completed in the early spring.

\*Treasurer A. P. Smith Mfg. Co., East Orange, N. J.

# Mass Production at the Winchester Shops\*

Details as Typified in the Making of Cartridges—A Product in Which the Material Cost and Scrap Recovery Are Important

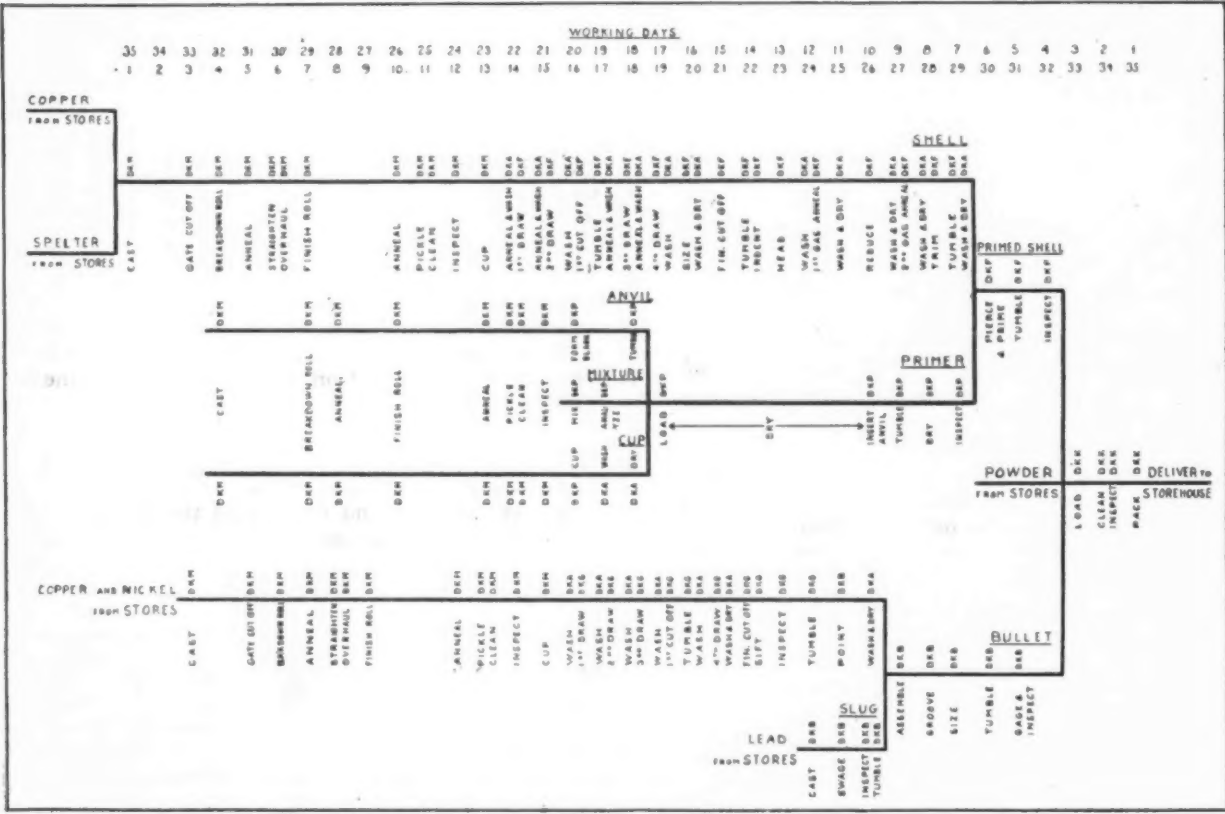
BY W. E. FREELAND

THE production problem of the cartridge department is made interesting, not so much by the variety of product as by the volume. Handling half a billion pieces a day involves complex tally problems; the relatively high cost of raw material (75 per cent of the finished product) makes it necessary to maintain a rapid flow of work in order to keep the inventory of work in process low; the value and volume of scrap (nearly four times the direct labor cost), most of which is put back into process, adds to the difficulty and importance of production control.

From the assembly operation and time chart, Fig. 1, it will be seen how quickly any interference to production will be reflected and how little opportunity there is to make up lost time. This chart

solve. That problem is to determine the stocks which should be carried—of finished products, finished components and tools—to give good service to customers without carrying too large an inventory. Each successive step back from the finished product means a longer period before shipment but less invested in inventories. The decision was made that in cartridge making the most efficient plan was to stock heavily in tools and to a less degree in brass previous to the finish rolling to final thickness, at which point the raw material stock is very flexible and a smaller investment serves a much wider range of finished product. The turnover from this point is from one-half to one-third that required when it is necessary to start with the initial processes.

There are great seasonal variations in the sales



Typical Assembly Chart for Making Cartridges

emphasizes the necessity for a system of control which provides for ample preparation well ahead of production, and also provides ways to promptly overcome interferences. The very high relative cost of raw materials makes it unprofitable to maintain any appreciable reservoirs of partially or completely finished components or tools to draw from in case of delays.

Cartridge manufacture furnishes an interesting example of a problem many industries have to

of cartridges, and these variations make it very difficult to maintain proper stocks on a maximum and minimum basis, so the scheme of controlling by schedules has been adopted. On the first of each month the sales department furnishes to the cartridge department a loading schedule for a month, but three months in advance. Thus the July schedule is sent to the cartridge department on April 1. The monthly schedule furnishes lots of sufficient size for economical manufacturing, but at the same time is short enough to permit the sales department to correct its estimates and make any required adjustments in the next schedule without material inconvenience. By this method expensive and demor-

\*Fifth article on the organization and management of the Winchester Repeating Arms Co., New Haven. General features were covered in the issue of Jan. 3; the engineering departments, in the issue of Jan. 17; methods of handling costs, in the issue of Jan. 24, and the application of the management system to the cartridge shops on Feb. 21.



In the process of shellacing heads and necks, the metallic cartridges are placed in a vibrating hopper shown in the background and dropped in a vertical position into the filling frame and from this dropped into the carrier shown in the foreground. They pass through an automatic shellacing machine which first shellacs the primers and then the



necks of the cartridges. They are placed upon a roller conveyor and the girl at the extreme right removes the surplus shellac. They continue along the gravity conveyor through all electrically heated drying apartment and as they emerge from this are set upright for inspection. The girl at the left in the foreground is inspecting the cartridges as they go by, punching out improperly shellaced cartridges, which fall into the box shown at the bottom. As the cartridge carriers continue around the roller conveyor they reach a combined lifting and dumping device which deposits the shells in a conveyor box and carries the empty carrier up to the loading machine again.

alizing changes of the manufacturing program are obviated.

The lot system of production has been adopted in place of the flow system, because it possesses these advantages: Preparation is simplified; definite unit prices can be secured on each lot; a continuous inventory of work in process can be obtained, and a definite closing of the books can be secured without a physical inventory or estimates.

The monthly schedule furnished by the sales department specifies the finished goods wanted; general plan sheets, Fig. 2, furnish the manufacturing information necessary to furnish proper instructions for the shops, and balance of stores sheets, Fig. 3, show the status of existing stock and open orders. There are a general plan sheet and a balance sheet for each finished product and each component part. The information necessary to originate production orders is obtained from the three foregoing records. A loading order for each item on the schedule is written and apportioned on the balance sheets. A material list, Fig. 4, and a tool list, Fig. 5, are written by referring to the general plan sheet.

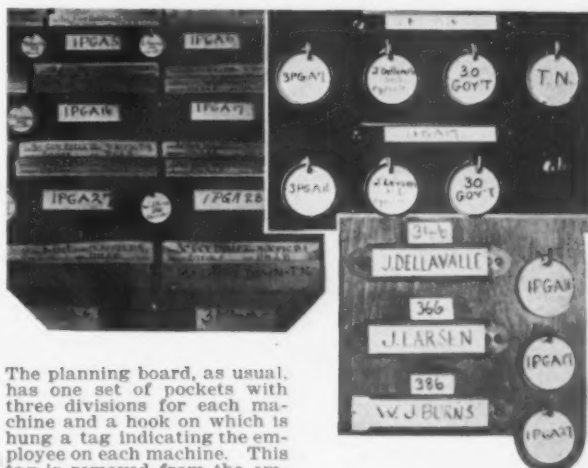
From the tool lists, stores issues are written for tools shown by the balance sheets to be in stock and manufacturing orders are prepared for tools that must be made. Raw materials and component parts are apportioned directly from the material lists, and production orders, Fig. 6, for components to be made and purchase requisitions for raw materials not in stock are originated. Owing to the necessity for "stringing" lots, due to the great physical volume of the product, the shops, upon the authority of the proper order, originate the issues for withdrawing raw materials or worked materials from stores. A periodic adjustment of the apportionment is made to compensate for the difference between actual issues and quantities apportioned.

All the foregoing work is done by the planning section, which also prepares the shop instructions for the performance of each operation. These instructions include a sub-order, Fig. 7; a machine set-up card, Fig. 8, for each operation, and identification cards or blocks for each box of work. A sub-order for each operation is necessary, as one

shop usually performs but one or two operations. The return of the sub-order is a notification of the completion of each operation.

Copies of each production order, together with sub-orders, tool lists and machine set-up tickets for each operation, and stores issues for tools are sent to the scheduling section by the planning section, whereupon the master plan of work, Fig. 9, is placed in an active file and after a tentative date is set for running the lot, the tool lists, stores issues and the preparation copy of the machine set-up ticket are sent to the preparation section.

When the preparation section has the tools in the shop cage ready for the job, the tools prepared space on the preparation copy of the machine set-up ticket is initialed and dated and the ticket returned to the scheduling section.



The planning board, as usual, has one set of pockets with three divisions for each machine and a hook on which is hung a tag indicating the employee on each machine. This tag is removed from the employee's board and hung on the machine hook, and the machine tag is hung on the employee's board. In case a machine is shut down a card is put in the front pocket, showing the interference, as Machine Down—TN, indicating no tools. Where there is a more or less continuous flow of the same product day in and day out, a machine board is substituted for the planning board, which merely records for each machine: machine symbol; operator assigned to machine; kind of work for which set up; interference.

The scheduling section, upon the return of the preparation ticket, proceeds to finally schedule each operation. As yet no attempt is made in the department office to schedule to individual machines, each shop being considered as a single productive unit, with a certain weekly capacity when running a specified number of hours, and sub-orders are issued up to this capacity. The assignment of work

the moving of the work is a routine matter handled by truckers assigned to specific routes, who pick up such material as has accumulated since their last trip and convey it to the next shop. To prevent mixing the work, each box has an identification card.

The scheduling section sends one copy of the sub-order and three copies of the machine set-up

**1-CTGE. DEPT. GENERAL PLAN**

SHTS. NO. \_\_\_\_\_ CALIBER \_\_\_\_\_ ARTICLE \_\_\_\_\_

**2-BALANCE OF WORKED MATERIALS**

INSTRUCTIONS FOR POSTING:

- WHEN QUANTITIES ARE SCHEDULED, ADD TO COLUMN 5.
- WHEN QUANTITY ORDER IS WRITTEN, ADD QUANTITY ORDERED TO COLUMNS 1 & 4 AND SUBTRACT FROM COLUMN 5.
- WHEN QUANTITY IS DELIVERED TO STOCK, SUBTRACT THE QUANTITY FROM COLUMN 1 AND ADD TO COLUMN 5.
- WHEN QUANTITY IS APPORTIONED, ADD TO COLUMNS 3 AND SUBTRACT FROM COLUMNS 1 & 4.
- WHEN QUANTITY IS USED, SUBTRACT FROM COLUMNS 1 & 4 AND ADD TO COLUMN 5.

**3-CARTRIDGE DEPT. TOOL LIST**

TO SCHEDULING SECTION

PLEASE THE FOLLOWING

QTY IN THIS LOT \_\_\_\_\_ DESCRIPTION \_\_\_\_\_ LOT NO. \_\_\_\_\_

REMARKS \_\_\_\_\_

**6-CARTRIDGE DEPARTMENT PRODUCTION ORDER NO.**

TO SCHEDULING SECTION

PLEASE THE FOLLOWING

QTY IN THIS LOT \_\_\_\_\_ DESCRIPTION \_\_\_\_\_ LOT NO. \_\_\_\_\_

REMARKS \_\_\_\_\_

**7-CARTRIDGE DEPARTMENT PRODUCTION SUB-ORDER NO.**

TO SCHEDULING SECTION

PLEASE THE FOLLOWING

QTY IN THIS LOT \_\_\_\_\_ DESCRIPTION \_\_\_\_\_ LOT NO. \_\_\_\_\_

REMARKS \_\_\_\_\_

**8-CARTRIDGE DEPT. GENERAL PLAN**

SHTS. NO. \_\_\_\_\_ CALIBER \_\_\_\_\_ ARTICLE \_\_\_\_\_

**9-CARTRIDGE DEPT. TOOL LIST**

TO SCHEDULING SECTION

PLEASE THE FOLLOWING

QTY IN THIS LOT \_\_\_\_\_ DESCRIPTION \_\_\_\_\_ LOT NO. \_\_\_\_\_

REMARKS \_\_\_\_\_

The Planning Section in Providing the Manufacturing Activities for a Month have Recourse to the Blanks Here shown

to individual machines is left to the shop foreman. So far the centralization of control is limited to the extent necessary to secure proper co-ordination of schedules and proper preparation.

Due to the standardized manufacturing specifications, the flow of work through the shops is practically automatic, so that it is only essential for the departmental office to have control of the machine set-ups. No move tickets are required, as

tickets to the group, or general foreman's, office, whence the machine set-up tickets are sent to the designated shops and the sub-orders are filed by order, all the sub-orders of one production order being filed in sequence of operations. The scheduling section retains two copies of each sub-order, filing one by shops, subdivided by order numbers, and filing the other in a tickler file of starting and finishing dates. These are followed up by the

[illegible]

### The Master Plan of Work for Following a Lot of Work when Orders Have Been Dispatched to the Scheduling Section

scheduling section to see that the production function is maintaining the schedules laid down.

A group office serves as the headquarters of the general foreman of a group of shops, the functional overseers, chief clerk and payroll clerk. The shop offices tally and report all time and quantities to the group office, where all rates are kept and the financial computing of the payroll done. A copy of the master plan of work is kept in all group offices to show the status of the work. The information for posting to these and to the original master plan of work retained by the departmental scheduling section is obtained from the various copies of the machine set-up tickets en route into or out of the shops. A schedule board for all shops is maintained in the departmental office as a means of quick reference and to visualize the status of all open production orders. Each shop keeps the next shop ahead informed of the start and finish of each lot by a simple notice slip.

Assignment of machines is made by the shop foreman from a planning board on which there is a pocket for each machine and three divisions in each

pocket: Work ahead not ready (top); work ahead ready (middle), and work in process (front). The symbols of the machines assigned are entered on the three copies of the machine set-up ticket. The instruction copy of the ticket is placed in the work-ahead-not-ready pocket, and if more than one machine is assigned extra tickets for each machine must be written and placed on the board. The preparation copy of the ticket is given to the machine adjuster, who withdraws the tools from the tool cage, sets up the machine, and returns the ticket, properly initialed and dated, to the shop clerk, who attaches the preparation and instruction copies of the ticket together, moving both into the work-ahead-ready pocket. As each machine starts on a lot, the instruction ticket is put into the working pocket and the preparation copy returned to the group office and thence to the scheduling section as a notice that the lot has been started.

Each shop foreman is required to maintain a small card file on his desk, with three divisions: Orders not started; orders started; orders held up by interferences. The schedule copies of the ma-

[illegible]

For Labor Control, Cards Shown in Figs. 10 and 11 are Used, and From These in Part Is Made Up the Labor Distribution Costs, Fig. 12. The Way a Lot Record Is Kept Is Shown in Fig. 13



chine set-up tickets are placed in the proper divisions of this file to show the status of the orders in the shop. Thus the combination of this small file and the planning board shows the status of every order and of every machine, so that the foreman or any one else can quickly determine the condition of the shop. Cards indicating the reasons for interferences are placed on the planning board as soon as interferences are reported.

Labor is controlled by means of operation cards, Fig. 10, and the use of "late arrival—early exit" cards, Fig. 11. Each operator registers in by lifting his operation card from the attendance boards and registers out by depositing it therein when leaving. The attendance board is locked except at the regular starting and leaving times, so that any employee irregular in attendance must apply to the shop office, where a late-arrival-early-exit card is signed before his operation card is issued or before he can get by the watchman at the gate.

Production is tallied by weight on a weight tally sheet, or, where a machine is equipped with a counting device, upon a counter tally sheet. The weight tally sheet is converted to quantity in the shop office.

Each time an operator changes a lot the operation card must be changed and the time stamped at the shop office. The cards are all stamped with the starting time each session before being placed in the attendance boards. All operation cards must be turned in at the end of each shift. The production shown by the tally sheets is posted to the operation cards, the time checked and the cards forwarded to the group office for making up the payroll and the labor distribution cards, Fig. 12. Time clocks are not necessary with this system, but each shop office must have a time stamp.

collected and all sent to the central tool cage, whence the tool list and instruction ticket are sent to the scheduling section via the preparation section. The scheduling ticket is sent to the group office where the tool list is attached, sub-orders removed from the active to the completed file, the lot schedule board cleared and the ticket is then sent to the scheduling section. The group office checks each lot upon completion to make sure that no work has been left uncompleted or undelivered and that all scrap has been sent to the central scrap inspection point for credit. The scheduling section is responsible for the return of all papers to the planning section when the lot has been completed, including the original copy of the production order.

The high relative value of the scrap produced makes it necessary to use extreme care to secure proper tallies and credits for the scrap from each lot. This is accomplished by sending all copper-bearing scrap to a central weighing and inspection point, each box of scrap being identified by a scrap card, Fig. 14, showing the lot that should be credited. The inspectors in the shop determine what is scrap, but at the central point it is again inspected before being put into stores for re-use and all foreign matter thrown out. The scrap cards are summarized each day on a copper scrap tally sheet.

A transfer slip, Fig. 15, is provided for use when it is necessary to transfer materials from one lot to another without passing it through stores, and if there are a number of transfers to be made from one account, cartridge brass, for instance, to several order numbers, a group transfer sheet, Fig. 16, is employed. Excess material drawn from stores and returned without being processed is reported on stores, Fig. 17, or worked material credit slips. De-

The Care Taken to Keep Records of Movements of Materials, Including Scrap, Is Indicated in the System of Cards and forms Here Shown

Production is posted from the tally sheets to a lot record, Fig. 13, which is the permanent shop record of all lots upon which any work has been done. Upon the completion of a lot the two copies of the machine set-up ticket remaining in the shop are signed, dated and the production and scrap posted. The instruction copy is sent to the shop tool cage where the tool list is attached, the tools

liveries to worked material or finished stores are reported on worked-material-received slips. The triplicate copy is signed by the trucker and left with the originator as his receipt, serving on the last delivery as the authority for closing out the lot. The original and duplicate copies accompany the goods, the trucker securing the signature of the consignee on the duplicate copy and retaining it as

his receipt. It will be noted that this method of receipting for goods is identical in principle with the express company methods where the transporting agent assumes liability for goods from the time picked up until delivered and receipted for at destination.

After checking the delivery the consignee signs the original and sends it to balance of stores which



An Attendance Board, Locked Except at Starting and Quitting Times, Provides Pockets for Individual Operation Cards Deposited, for Example, at Leaving Time. Time Clocks are Not Used

posts it to the balance sheet and then forwards it to the cost division. Where there are a great many deliveries of the same finished components or ammunition from one point to another each day, a tally of the shipments is posted on a tally transfer sheet, Fig. 18, and a single worked-material-received sheet is made out for each item on the tally transfer sheet. This saves considerable clerical labor and lessens the number of papers to be handled.

A report of production by lots is made daily by each shop on a production report form and a similar report of scrap by lots is made on a similar scrap report form. These are posted from the tally sheets. These two reports show what a shop has done but they do not show what the shop might have done and did not do. To show this, together with reasons for inactivity, it is necessary to secure an analysis of the idle machine time, and this is secured by recording on a machine-interruption record, maintained in the shop office, the idle time of each machine classified under four general heads: machines, materials, men and tools. These are shown in further detail by the use of symbols found on a printed list of standard interruptions.

The interruptions by machines are totalled vertically and by causes horizontally. The totals are posted either daily or weekly to a machine activity report, copies being provided for the shop office, group office and department office. This report of machine activity with analysis of causes has proven invaluable. The frequency of the reports is varied according to the exigencies of operating conditions, but the shop record is maintained regularly as a routine matter.

The activity of the machine is important, not alone as affecting the production in a single shop, but also as affecting the productivity of other shops and to secure a prompt record of production hold-ups amounting to an hour or more, an interruption card is made out in triplicate and copies sent to both the group and department offices. Removal of the interruption is reported by sending the third copy from the shop office to the department office via the group office.

## LIST OF SHIPBUILDERS

### Emergency Fleet Corporation Announces Names of Those Building Ships

The Emergency Fleet Corporation, Washington, D. C., announces the following list of shipbuilders now engaged on work for the United States Government, with addresses of business offices and locations of shipyards:

#### Builders of Steel Vessels

- AMERICAN INTERNATIONAL CORPORATION.  
Office 140 North Broad Street, Philadelphia.  
Works Philadelphia (Hog Island).
- THE ATLANTIC CORPORATION.  
Office Alexandria, Va.  
Works Portsmouth, N. H.
- THE AMERICAN SHIPBUILDING CO.  
Office foot of West Fifty-fourth Street NW., Cleveland.  
Works various Great Lake ports.
- AMERICAN SHIPBUILDING CORPORATION.  
Office Alexandria, Va.  
Works Alexandria, Va.
- BALTIMORE DRY DOCK & SHIPBUILDING CO.  
Office Baltimore, Md.  
Works Baltimore, Md.
- BAYLES SHIPYARD (INC.).  
Office 115 Broadway, New York.  
Works Port Jefferson, Long Island, N. Y.
- CALIFORNIA SHIPBUILDING CO.  
Office Long Beach, Cal.  
Works Long Beach, Cal.
- COLUMBIA RIVER SHIPBUILDING CORPORATION.  
Office Portland, Ore.  
Works Portland, Ore.
- DOWNNEY SHIPBUILDING CORPORATION.  
120 Broadway, New York.  
Milliken, Richmond Borough, New York.
- DANIELS, OSCAR, CO.  
Office Woolworth Building, New York.  
Works Tampa, Fla.
- ERICKSON ENGINEERING CO. (INC.).  
Office New York, eighteenth floor Hanover National Bank Building, Nassau and Pine Streets.  
Works Seattle, Wash.
- FEDERAL SHIPBUILDING CO.  
Office 54 Dey Street, New York.  
Works Hackensack River, N. J.
- GROTON IRON WORKS.  
Offices 50 Broad Street, New York, N. Y.; Groton, Conn.  
Works Groton, Conn.; Noank, Conn.
- HAMPTON ROADS SHIPBUILDING & DRY DOCK CORPORATION.  
Office Norfolk, Va.  
Works Norfolk, Va.
- JAHNCKE SHIPBUILDING CO. (INC.).  
Office 814 Howard Avenue, New Orleans.  
Works New Orleans.
- LOS ANGELES SHIPBUILDING & DRY DOCK CO.  
Offices Box C, San Pedro, Cal.; Los Angeles, Cal.  
Works Los Angeles Harbor, Cal.
- MERRILL STEVENS SHIPBUILDING CORPORATION.  
Office Jacksonville, Fla.  
Works Jacksonville, Fla.
- MOORE & SCOTT IRON WORKS.  
Office San Francisco.  
Works Oakland, Cal.
- MERCHANT SHIPBUILDING CORPORATION.  
Office 165 Broadway, New York; correspondence, Finance Building, Philadelphia.  
Works Bristol, Pa.
- NEWBURGH SHIPYARDS (INC.).  
Office Newburgh, N. Y.  
Works Newburgh, N. Y.
- NORTHWEST STEEL CO.  
Office Portland, Ore.  
Works Portland, Ore.
- PATTERSON-McDONALD SHIPBUILDING CO.  
Office Seattle, Wash.  
Works Seattle, Wash.
- PACIFIC COAST SHIPBUILDING CO.  
Office First National Bank Building, San Francisco.  
Works Suisun Bay, San Francisco.
- PENSACOLA SHIPBUILDING CO.  
Office 155 North Clark Street, Chicago.  
Works Pensacola, Fla.
- SKINNER & EDDY CORPORATION.  
Office Smith Building, Seattle, Wash.  
Works Seattle, Wash.

SEATTLE CONSTRUCTION & DRY DOCK CO.  
Office Seattle, Wash.  
Works Seattle, Wash.

SOUTHERN SHIPBUILDING CORPORATION.  
Office Charleston, S. C.  
Works Charleston, S. C.

SUN SHIPBUILDING CO.  
Office correspondence, 1428 South Penn Square, Philadelphia.  
Works Chester, Pa.

SAGINAW SHIPBUILDING CO.  
Office Saginaw, Mich.  
Works Saginaw, Mich.

SUBMARINE BOAT CORPORATION.  
Office 5 Nassau Street, New York.  
Works Newark, N. J.

WESTERN PIPE & STEEL CO. OF CALIFORNIA.  
Office San Francisco.  
Works South San Francisco.

#### Builders of Wood Vessels

ALABAMA DRY DOCK & SHIPBUILDING CO.  
Office Mobile, Ala.  
Works Mobile, Ala.

AMERICAN SHIPBUILDING CO.  
Office 11 Broadway, New York.  
Works Brunswick, Ga.

BEAUMONT SHIPBUILDING & DRY DOCK CO.  
Office Beaumont, Tex.  
Works Beaumont, Tex.

BARBARE BROS.  
Office Tacoma, Wash.  
Works Tacoma, Wash.

BENICIA SHIPBUILDING CORPORATION.  
Office 131 Loidesdorff Street, San Francisco.  
Works Benicia, Cal.

COAST SHIPBUILDING CO.  
Office 504 Concord Building, Portland, Ore.  
Works Portland, Ore.

CUMBERLAND SHIPBUILDING CO.  
Office Portland, Me.  
Works South Portland, Me.

COOS BAY SHIPBUILDING CO.  
Office Marshfield, Ore.  
Works Marshfield, Ore.

CHANDLER, R. J.  
Office Los Angeles, Cal.  
Works Wilmington, Los Angeles, Cal.

DANTZLER SHIPBUILDING & DRY DOCK CO.  
Office Moss Point, Miss.  
Works Moss Point, Miss.

DIERKS-BLODGETT SHIPBUILDING CO.  
Office care of Dierks Lumber & Coal Co., Kansas City, Mo.  
Works Pascagoula, Miss.

FEENEY & BREMER CO.  
Office Tillamook, Ore.  
Works Tillamook, Ore.

THE FOUNDATION CO.  
Office Woolworth Building, New York City.  
Works Passaic River, Newark, N. J.

FULTON SHIPBUILDING CO.  
Office Los Angeles, Cal.  
Works head Mormon Channel, Wilmington, Cal.

FREEPORT SHIPBUILDING CO.  
Office Freeport, Me.  
Works South Freeport, Me.

GRAYS HARBOR M. S. CORPORATION.  
Office Aberdeen, Wash.  
Works Grays Harbor, Wash.

GROTON IRON WORKS.  
Office 50 Broad Street, New York.  
Works Noank, Conn.

GRANT-SMITH-PORTER-GUTHRIE CO.  
Office foot Baltimore Street, St. Johns, Portland, Ore.  
Works St. Johns, Ore.

GILDERSLEEVE SHIP CONSTRUCTION CO.  
Office Gildersleeve, Conn.  
Works Gildersleeve, Conn.

GEO. A. GILCHRIST.  
Office 60 Main Street, Thomaston, Me.  
Works Thomaston, Me.

HILLIER-SPERRING-DUNN CO.  
Office Jacksonville, Fla.  
Works Jacksonville, Fla.

HAMMOND LUMBER CO.  
Office San Francisco.  
Works Humboldt Bay, Cal.

HODGE SHIP CO.  
Office Moss Point, Miss.  
Works Moss Point, Miss.

HOUSATONIC SHIPBUILDING CO. (INC.).  
Office Stratford, Conn.  
Works Housatonic River, Stratford, Conn.

HELDENFELS BROS.  
Office Beeville, Tex.  
Works near Fort Aransas, Tex.

JAHNECKE SHIPBUILDING CO. (INC.).  
Office New Orleans.  
Works Tchefuncta River, La.

JOHNSON SHIPYARDS CORPORATION.  
Office 2341 Richmond Terrace, Mariners Harbor, Shooters Island, N. Y.  
Works Mariners Harbor, New York.

KINGSTON SHIPBUILDING CO.  
Office Kingston, N. Y.  
Works Rondout Creek, Kingston, N. Y.

KRUSE & BANKS SHIPBUILDING CO.  
Office North Bend, Ore.  
Works North Bend, Ore.

THE KELLY SPEAR CO.  
Office Bath, Me.  
Works Bath, Me.

LAKE & OCEAN NAVIGATION CO.  
Office Room 1124, 208 South La Salle Street, Chicago.  
Works Sturgeon Bay, Wis.; delivery, Montreal, Canada.

LONE STAR SHIPBUILDING CO.  
Office 111 Broadway, New York.  
Works Beaumont, Tex.

MARYLAND SHIPBUILDING CO.  
Office Lexington Building, Baltimore, Md.  
Works Sollers Point, Md.

MCBRIDE & LAW.  
Office Beaumont, Tex.  
Works Naches River, Beaumont, Tex.

J. N. MCCAMMON.  
Office Houston, Tex.  
Works Beaumont, Tex.

MURNAN SHIPBUILDING CORPORATION.  
Office 836 Commercial Trust Building, Philadelphia.  
Works Pinto Island, Mobile, Ala.

J. M. MURDOCK.  
Office Jacksonville, Fla.  
Works Jacksonville, Fla.

MIDLAND BRIDGE CO.  
Office 504-510 Midland Building, Kansas City, Mo.; all mail to Houston, Tex.  
Works Ship Channel, Houston, Tex.

MOREY & THOMAS.  
Office Post Office Box 619, Jacksonville, Fla.  
Works St. Johns River, Jacksonville, Fla.

MEACHAM & BABCOCK SHIPBUILDING CO.  
Office Seattle, Wash.  
Works Salmon Bay, Wash.

MCEACHERN SHIP CO.  
Office Portland, Ore.  
Works Astoria, Ore.

NEWCOMB LIFEBOAT CO.  
Office Hampton, Va.  
Works Hampton, Va.

NATIONAL SHIPBUILDING CO.  
Office 120 Broadway, New York.  
Works Orange, Tex.

NORTH CAROLINA SHIPBUILDING CO.  
Office Morehead City, N. C.  
Works Morehead City, N. C.

NILSON & KELEZ SHIPBUILDING CORPORATION.  
Office Seattle, Wash.  
Works Seattle, Wash.

PENINSULA SHIPBUILDING CO.  
Office Portland, Ore.  
Works Portland, Ore.

PORTLAND SHIP CEILING CO.  
Office 130 Commercial Street, Portland, Me.  
Works Portland, Me.

POTOMAC SHIPBUILDING CO.  
Office Colorado Building, Washington.  
Works Quantico, Va.

RODGERS, GEO. F. & CO.  
Office Astoria, Ore.  
Works Astoria, Ore.

G. M. STANDIFER CONSTRUCTION CORPORATION.  
Office 611 Northwestern National Bank Building, Portland, Ore.  
Works Portland, Ore.

SLOAN SHIPYARDS CORPORATION.  
Office Olympia, Wash.  
Works Olympia and Seattle, Wash.



SANDERSON & PORTER.  
Office 52 William Street, New York.  
Works Willapa Harbor, Wash.

SHIP CONSTRUCTION & TRADING CO.  
Office 50 Broadway, New York.  
Works Stonington, Conn.

HENRY SMITH & SONS CO.  
Office 7 East German Street, Baltimore, Md.  
Works Baltimore, Md.

SOUTHERN DRY-DOCK & SHIPBUILDING CO.  
Office Orange, Tex.  
Works Orange, Tex.

L. H. SHATTUCK (INC.).  
Office Manchester, N. H.  
Works Piscataqua River, Portsmouth, N. H.

SOMMARSTROM SHIPBUILDING CO.  
Office care Maj. C. L. Tilden, 217 Front Street, San Francisco.  
Works Columbia City, Ore.

SEABORN SHIPYARDS CO.  
Office 812 Leary Building, Seattle, Wash.  
Works Tacoma, Wash.

ST. HELENS SHIPBUILDING CO.  
Office 900 Fife Building, San Francisco.  
Works St. Helens, Ore.

SANDY POINT SHIPBUILDING CORPORATION.  
Office Sandy Point, Me.  
Works Sandy Point, Me.

TACOMA SHIPBUILDING CO.  
Office Tacoma, Wash.  
Works Tacoma, Wash.

TRAYLOR SHIPBUILDING CORPORATION.  
Office Allentown, Pa.; Cornwells Heights, Pa.  
Works Cornwells Heights, Pa.

TAMPA DOCK CO.  
Office Tampa, Fla.  
Works Tampa, Fla.

UNIVERSAL SHIPBUILDING CO.  
Office 515 Union National Bank Building, Houston, Tex.  
Works Houston Ship Canal, Harris County, Tex.

UNION BRIDGE & CONSTRUCTION CO.  
Office Morgan City, La.  
Works Morgan City, La.

U. S. MARITIME CORPORATION.  
Office 502 Union Savings Bank Building, Washington.  
Works Brunswick, Ga.

WILSON SHIPBUILDING CO.  
Office Astoria, Ore.  
Works Astoria, Ore.

WRIGHTS SHIPYARDS.  
Office Tacoma, Wash.  
Works Tacoma, Wash.

YORK RIVER SHIPBUILDING CORPORATION.  
Office West Point, Va.  
Works West Point, Va.

#### Builders of Composite Vessels

MOBILE SHIPBUILDING CO.  
Office Mobile, Ala.  
Works Mobile, Ala.

KELLY ATKINSON CONSTRUCTION CO.  
Office Security Building, Chicago.  
Works Mobile, Ala.

MERRILL STEVENS CO.  
Office Jacksonville, Fla.  
Works Jacksonville, Fla.

SUPPLE & BALLIN.  
Office Portland, Ore.  
Works Portland, Ore.

TERRY SHIPBUILDING CORPORATION.  
Office Savings Bank & Trust Co., Savannah, Ga.  
Works Port Wentworth Terminal, Savannah, Ga.

#### Builders of Concrete Vessels

LIBERTY SHIPBUILDING CO.  
Office 515 State Street, Boston.  
Works not decided on.

#### Yards Building Requisitioned Ships

ALBINA ENGINE & MACHINE WORKS.  
Office Portland, Ore.  
Works Portland, Ore.

AMES SHIPBUILDING & DRY DOCK CO.  
Office Seattle, Wash.  
Works Seattle, Wash.

BETHLEHEM STEEL CO.  
Office South Bethlehem, Pa.  
Works Sparrows Point, Md.

CRAMP, WILLIAM & SONS SHIP & ENGINE BUILDING CO.  
Office Philadelphia.  
Works Philadelphia.

CHESTER SHIPBUILDING CO.  
Office 1264 Finance Building, Philadelphia.  
Works Chester, Pa.

CRAIG SHIPBUILDING CO.  
Office Long Beach, Cal.  
Works Long Beach, Cal.

DUTHIE, J. F. & CO.  
Office Seattle, Wash.  
Works Seattle, Wash.

FORE RIVER SHIPBUILDING CORPORATION.  
Works Quincy, Mass.

GREAT LAKES ENGINEERING WORKS.  
Office Detroit.  
Works Detroit.

GLOBE SHIPBUILDING CO.  
Office Superior, Wis.  
Works Superior, Wis.

HANLON DRY DOCK & SHIPBUILDING CO.  
Office Oakland, Cal.  
Works Oakland, Cal.

HARLAN & HOLLINGSWORTH CORPORATION.  
Works Wilmington, Del.

MANITOWOC SHIPBUILDING CO.  
Office Manitowoc, Wis.  
Works Manitowoc, Wis.

MOORE, SAMUEL L. & SONS CORPORATION.  
Works Elizabeth, N. J.

MCDUGALL-DULUTH CO.  
Office Duluth, Minn.  
Works Duluth, Minn.

NEWPORT NEWS SHIPBUILDING & DRY DOCK CO.  
Office Newport News, Va.  
Works Newport News, Va.

NEW YORK SHIPBUILDING CORPORATION.  
Office Camden, N. J.  
Works Camden, N. J.

NEW JERSEY SHIPBUILDING CO.  
Office Land Title Building, Philadelphia.  
Works Gloucester, N. J.

PENNSYLVANIA SHIPBUILDING CO.  
Office Land Title Building, Philadelphia.  
Works Gloucester, N. J.

PUSEY & JONES CO.  
Office Wilmington, Del.  
Works Wilmington, Del.

STANDARD SHIPBUILDING CO.  
Office 44 Whitehall Street, New York.  
Works New York, N. Y.

STATEN ISLAND SHIPBUILDING CO.  
Office Port Richmond, New York.  
Works Port Richmond, New York.

TEXAS STEAMSHIP CO.  
Office Bath, Me.  
Works Bath, Me.

TOLEDO SHIPBUILDING CO.  
Office Toledo, Ohio.  
Works Toledo, Ohio.

TAMPA SHIPBUILDING CO.  
Office Tampa, Fla.  
Works Tampa, Fla.

UNION IRON WORKS.  
Works San Francisco.

WILLAMETTE IRON & STEEL WORKS & NORTHWEST STEEL CO.  
Office Portland, Ore.  
Works Portland, Ore.

#### New England Iron and Hardware Association

The New England Iron and Hardware Association held its 25th annual dinner at the Hotel Somerset, Boston, Feb. 27. Vice-President Charles W. Henderson, Jr., A. C. Harvey Co., presided and introduced as toastmaster Hon. Samuel L. Powers, who has served in that capacity for many years. In recognition of that fact, R. M. Boutwell, in behalf of the organization, presented him with a mahogany clock. The services of A. B. Marble, Jones & Laughlin Co., who has long served as the chairman of the committee of arrangements, were recognized by the gift of a traveling bag, presented by Frank E. Bragg.

The first speaker was Hon. A. P. Langtry, Massachusetts Secretary of State. Rev. Howard J. Chidley, Winchester, Mass., spoke on the effect of socialism in Germany and America, pointing out how in Germany socialism came down from the top and in America up from the bottom. Hon. Thomas Sterling, senator from South Dakota, delivered a carefully prepared address of which the subject might well have been announced as "Efficient Democracy."

# Unusual Conditions as to Refractories

## Production of Fire-brick Reduced on Account of Coal Shortage — Prices of Magnesia Brick Reduced — Some Effects of the War

THE fundamental bearing of refractories on the production of iron and steel and the extent to which manufacturers have met war conditions, especially those which forced them to turn to new and in some cases untried sources of raw material, is of unusual interest at the present time, as shown by authoritative information.

The production of fire-brick such as is used in blast furnaces, open-hearth furnaces, cupolas, etc., has been materially reduced since the beginning of this year, because of coal shortage and transportation difficulties, in consequence of which few manufacturers have stocked any brick in this period, notwithstanding fewer orders from steel works and other consumers whose operations, for similar reasons, were reduced to about 50 per cent of capacity.

What is true of fire-brick is largely true also of silica brick, although many manufacturers took advantage of partial shut-downs to make necessary repairs to furnaces and ovens, a fact which caused the demand for silica brick to be better than actual conditions seemed to warrant. Silica brick enters into the construction of open-hearth furnaces and by-product coke ovens. The makers look for an active business as soon as railroad operations become normal, permitting the steel works and coke ovens to get somewhere near capacity production. The demand for new construction of by-product coke ovens has fallen off, and this should relieve a certain amount of the brick-manufacturing capacity.

### Price of Magnesia Brick Reduced

Most of the magnesite from which magnesia brick is made comes from the Pacific coast, and the production of the finished product has been much hampered by interruptions in the movement by rail of the raw material to Eastern points, as well as by the same insufficient supply of coal which upset all industry, while in the East railroad embargoes and delays have halted delivery of brick from manufacturers to consumers. Since the raising of the embargoes conditions are slowly returning to a more satisfactory basis, and the price of the brick was recently reduced from \$135 per net ton to \$125. Prompt deliveries can be made for the present, until the shortage due to delayed deliveries of the raw materials makes itself felt.

It is understood, of course, that no magnesite is coming to this country from Austria, formerly the chief source of supply, as it probably will be again. Canadian deposits containing 16 to 20 per cent lime have been found impracticable, and magnesite coming from the Western coast must be treated in a manner that results in a synthetic product. By the introduction of iron, aluminum and other elements, the necessary bond is imparted to the Western material.

Dead-burnt magnesite, or what is called ferromagnesite, is in fair demand at the present time, although its high cost has caused its displacement to some extent by dolomite substitutes. Recently the price of dead-burnt magnesite was reduced to \$75 per net ton, as compared with the former price of \$85.

### High Costs of Domestic Product

Under pre-war conditions, dead-burnt magnesite sold around \$16 per ton, f.o.b. Atlantic seaboard, but this price included a freight rate of only 8s to 9s per ton from Trieste, Austria. In contradistinction to this is the freight rate from California and Washington to the Eastern plants, where the magnesite is calcined, of approximately \$28.75 per ton of dead-burnt magnesite. For one ton of the latter 2.3 tons of crude magnesite is required. Also entering the production cost is the initial cost of the mineral (and the Western sell-

ers are not inclined to let it go cheaply), the cost of treating, bonding, calcining, etc.; and for magnesia brick there must also be added the cost of manufacture.

### Chrome Brick Makers Restricting Orders

In chrome brick, as with chromium, the situation is serious, because of the inadequate quantities of chrome ore which are available. The manufacturers of chrome brick are not taking any new orders except where they have ore on wheels. The winter season in the West, accompanied by much rain, has been a great detriment to shipping from points in California where the ore is obtained. In many cases it is hauled by teams or motors 30 or more miles to the railroad for shipment. It is admitted that the domestic product is not as good as that which comes from Greece or Turkey, but while the war continues it must suffice. Chrome brick, when obtainable, is bringing \$135 per net ton, the highest price yet quoted, and directly attributable to the high price and scarcity of ore.

The recent government investigation into the prices of refractory materials has not brought about any reduction, and, in view of the steadily increasing costs of manufacture, a great deal of doubt exists as to whether there will be any readjustment of prices at all. As soon as the war is ended price adjustments of dead-burnt magnesite, magnesia brick, chrome ore and chrome brick may be looked for, although it is probable that no substantial reduction will come until six months, or possibly a year, after the termination of hostilities. What happens then will be largely dependent on ocean freights.

### The Cleveland Market

Conditions as viewed at Cleveland are described as follows:

There is a heavy demand for first quality fire-clay brick and deliveries are slow, this being due to embargoes in Pennsylvania and to the car and coal shortage in Ohio, which has reduced production. The demand itself is above normal and Ohio plants are from eight to ten weeks behind on deliveries. Some plants

### Quotations on First-Quality Firebrick Clay in the Cleveland District, per 1000 Lb., f.o.b. Works

Pennsylvania .....	\$50.00
Missouri-Illinois .....	\$55.00 to 65.00
Ohio .....	45.00 to 50.00
Kentucky .....	45.00 to 55.00
Second quality fire clay brick:	
Pennsylvania .....	40.00 to 50.00
Ohio .....	30.00 to 38.00
Silica brick:	
Pennsylvania .....	50.00 to 60.00
Chicago .....	55.50 to 65.50
Birmingham .....	45.00 to 55.00

are much longer behind. Generally they have no stocks except those covered by orders. There is a plentiful supply of second quality fire-clay brick, owing to an increase in production and to the fact that some of the common brick manufacturers have recently been making the second-quality brick, which are used in cupolas, annealing furnaces, etc. There is a heavy new demand for the second-quality brick from the Government for powder plants.

There is a good demand for silica brick, and with recently increased production capacity the output is about equal to the demand. However, makers are behind on shipments, and cannot make definite promises on deliveries. They have no stocks and are making shipments direct from the kilns.

In general, it is claimed that Ohio manufacturers are in worse shape on deliveries than those in other sections.

The prices on refractories have advanced about 100 per cent in the past three years. Quotations on first quality fire-clay brick per 1000 f.o.b. works are about as given in the table on page 624.

#### The Pittsburgh District

Conditions in the Pittsburgh district are noted as follows:

Manufacturers of firebrick located in the Pittsburgh district report that orders on their books, at the present rate they are able to operate, will take practically their entire output for at least six months. Makers of firebrick have been restricted very much in shipments, owing to the embargoes and inability to get cars, and it is believed this has had the effect of very materially reducing stocks held by consumers. The demand recently has not been so active, but is expected to be heavier in the near future, owing to the fact that stocks have been very much reduced. Prices are very firm, silica brick selling at \$50 per 1000, and No. 1 firebrick about \$45 per 1000, f.o.b. cars, Mt. Union, Pa., this being the shipping point on which all prices on firebrick are based. The new demand for ganister used in making firebrick has been very heavy for several years, but in the past three or four months the embargoes and shortage in cars have greatly delayed shipments. Ganister is held at about \$1.50 per ton, f.o.b. cars, Hollidaysburg or Mt. Union, Pa. For a long time very large quantities of ganister have been shipped to the Electro-Metallurgical Co., Niagara Falls, N. Y., this company using it in the manufacture of 50 per cent ferro-silicon.

#### Magnesite Brick

Manufacturers of open-hearth steel, who have experienced difficulty in getting enough magnesite brick to line their furnaces because of reduced imports of the raw material, are now being provided for from domestic sources, according to an announcement by the United States Geological Survey. The demand for magnesite as the result of the situation of the iron and steel and other industries consuming this material in large quantities has greatly increased its domestic production.

Until 1915 the United States produced only about 10,000 tons of magnesite annually, although it used 300,000 tons. The domestic supply came from California and the imported material came from Austria, Hungary, and Greece. In 1916 the production in California jumped to 150,000 tons, but the imports, if the calcined material is computed as crude rock, fell to 93,000 tons. The supply, therefore, fell short of the demand. Manufacturers of open-hearth steel had difficulty in getting enough magnesite brick to line their furnaces, and companies that made magnesite flooring were short of raw material.

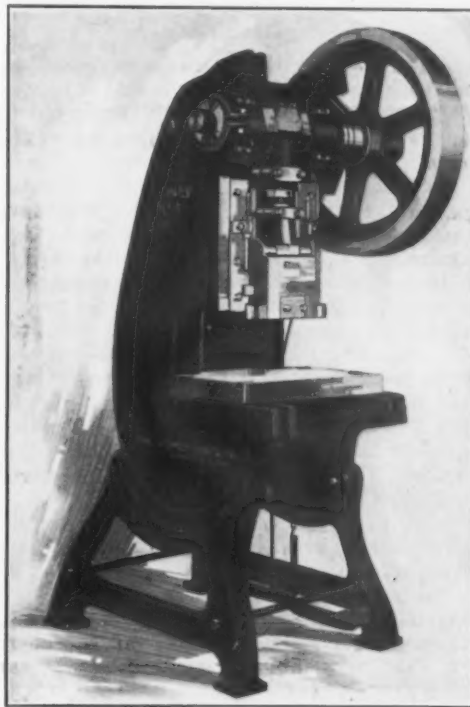
In view of this condition and the decrease in imports, domestic production was greatly stimulated. According to estimates by C. G. Yale of the United States Geological Survey, the production of magnesite in California in 1917 exceeded that of all former years, being estimated at 215,000 tons. This quantity and the magnesite produced in the recently discovered field in Stevens County, Washington, estimated by R. W. Stone of the United States Geological Survey, at close to 100,000 tons, make an output of about 315,000 tons in 1917, or 15,000 tons more than the normal domestic demand. In view of the great increase in production made in California and of the fact that some of the large properties in Washington were only partly developed at the close of 1917, it is believed that the domestic industry hereafter will be able not only to supply the home demand, but may be able to produce a surplus for the Allies.

The huge deposits of magnesite recently discovered in Stevens County, Washington, are only a few miles from a railroad, with a downgrade haul for the load, and are so situated that they can be easily quarried. The Washington magnesite is found in beds like limestone, in thick lenses up to a quarter of a mile long, exposed on hillsides or ridge tops where large quarries can be opened.

#### A Power Press with Special Clutch

The Sidney Power Press Co., Sidney, Ohio, which was only recently organized, is now making six sizes of power presses, weighing from 1000 to 6000 lb. As will be noted, the weight has been distributed at points where it is most needed—that is, in the frame, flywheel and bolster plate—thus giving the press the rigidity so necessary to a machine of this character. Tierods are furnished for the larger sizes, and thus assist materially in making the machine more rigid.

All of the machines are equipped with a patented automatic safety clutch that is relied upon to prevent the press from repeating. This clutch is arranged so that it is impossible for the press to make a second stroke, no matter how long the treadle is held down, until the operator removes his foot and again depresses the treadle. Perfect alignment of the slide is provided



An Automatic Safety Clutch Is Employed to Prevent the Press from Making a Second Stroke Until the Treadle Is Depressed Again

for by three adjusting screws in either gib. This makes it possible to true up the slide easily and quickly in the event of its becoming out of alignment after long and continuous use.

The hole in the slide for the shank of the punch is round, giving a continuous contact with the shank instead of only four points of contact, as in those using a square hole. Liberal room is provided for adjustment of the slide clamp, making easy insertion of the shank of the punch possible.

#### Price Fixing in the German Steel Industry

Complicated negotiations are taking place, says the London *Ironmonger*, between the German Government and the steel works for an alteration of the official selling prices and for the provisional renewal of existing syndicates. For months past the works have been trying to get the Government's consent to an all-round increase in prices as from Jan. 1, but without success. The last advance sanctioned was made on July 1, 1917. In October an application for a further increase was refused, but the works were told to apply again in December. This was done but again without success, except as regards Siegen District iron ore and manganese pig iron. The present maximum prices remain in force until the end of March. The Steel Works Union, however, notified its members only to sell on condition that if prices are increased during the current quarter, the higher rates are to apply to the uncompleted parts of the contract.



# Powdered Fuel in Steam and Steel Plants

## Use in Open-Hearth and Small Heating Furnaces —Pulverized Coke Breeze, Anthracite Coal and Washings—Cost Data and Plant Installations

**A**DAPTATIONS of pulverized coal to boilers and metallurgical furnaces was the subject of a paper presented to the Cleveland Engineering Society Sept. 18, by Henry G. Barnhurst, chief engineer, Fuller Engineering Co., Allentown, Pa. In the general discussion which followed his presentation he amplified some of the points put forth in his paper and parts of his discussion have been embodied in the following review:

### Pulverized Coke Breeze

Around steel plants there are large quantities of waste fuel, such as coke breeze. This fuel is being used to a certain extent on some grates using forced draft, but it can be burned in pulverized form under boilers for the generation of power and possibly in the open-hearth furnaces for making steel. Pulverized coke breeze burns like petroleum. It runs low in volatile matter, which ranges from 6 to 8 per cent. It was burned under a 400-hp. Rust boiler at the Allentown Portland Cement Co., where pure anthracite coal as well was burned. Coals with a low volatile content do not burn with the rapidity that coals with high volatile content do and the ignition does not travel back against the incoming jet. The result is the heat must be brought back to the nozzle or point of entrance to become self-supporting. Wherever the company tried to burn anthracite coal or low volatile coals without a secondary flame it failed. Coal or dirt from the washing of coal making coke also was burned. The dirt had 48 per cent combustible in it and 52 per cent ash. It appeared that the quantity of ash in the dirt was not important as long as there was sufficient carbon to give a good flame. However, using this fuel is not practicable, as two tons of material must be ground to give but one ton of combustible, which is an expensive process.

### Spontaneous Combustion of Pulverized Coal

The danger of spontaneous combustion of pulverized coal has been greatly exaggerated. Nothing more than usual precautions taken with all fuels are necessary to guard against it. However, the presence of pyrites tends to incite spontaneous combustion. Today apparatus of his company's make is grinding 10,000 to 15,000 tons of coal daily in 30 or 40 plants in the Lehigh Valley district. The last serious accident it had occurred about five years ago at Martin's Creek. At this point the men attempted to blow up some foundations in the coal plant while it was in operation, and some of this coal which had settled on the rafters overhead was sucked into the fire in the drier causing a puff and, in consequence, two men nearby were burned to death. An experienced operator would not have done this.

The most serious accident before that was 12 to 14 years ago at the Edison cement plant. There pulverized coal was passed through rolls and as it was reduced to a certain degree of fineness it was separated by air and the coarse tailings were passed through the rolls again. It was not a pulverizing action; it was a powdering action, and the product was much coarser than the present powder. An explosive mixture of coal and air was ignited in some manner and four men were burned, and nine were killed, including the engineer of the plant. This was the most serious accident that occurred through using pulverized coal and it happened because no particular attention had been paid by the engineers who built the plant to what previous practice in coal pulverizing plants had been. As a result of this accident the impression gained ground that pulverized coal was dangerous to handle. When properly handled, however, it is safe, and is not so dangerous as oil. Explosions in the conveyors and elevators are

not unheard of. The coal will occasionally catch on fire by oxidation or it may become too hot in the drier, but explosions do not occur unless the elevator is opened and there is an explosive mixture and a man happens to come along with a torch or lighted cigar. You can touch pulverized coal on the floor with a match and it will just smolder. But when you get it in the air in an explosive mixture it will go off as quickly as a snap of your finger.

### Operating Expenses and Cost of Equipment

The power required in a first class coal pulverizing plant is in the neighborhood of 17 hp. hr. per net ton of coal pulverized. This includes the power for crushing drying, elevating and conveying and delivering the pulverized coal to the conveyors leading to the point of use. The repairs vary slightly with the coal being handled, but generally the repair costs for the pulverizing plants should be somewhere between 5 and 7 cents per net ton of coal handled.

The drier fuel is practically a constant amount per ton of coal dried with a given moisture content. In the Lehigh Valley district, where the coals carry from 5 to 10 per cent of moisture as received, from 25 to 35 lb. of coal are required to a ton of coal dried. An evaporation of from 5 to 7 lb. of moisture from the coal being dried can be obtained per pound of coal burned on the grates of the drier. Coal should be dried so that its moisture will be less than 1 per cent, as it is economy to drive off the moisture at a low temperature rather than let it go into the furnace. The standard pulverizer today can handle coal having from 3 to 5 per cent moisture.

Generally speaking coal in large quantities from 50 to 100 tons and upward can be pulverized and delivered to the furnaces at a cost of from 20 to 50 cents per ton depending on the quantity handled. This does not include interest and depreciation, taxes, overhead expenses, etc., Generally speaking an ideal plant with a capacity of 100 tons of pulverized coal daily will cost, with the prevailing high prices in the neighborhood, from \$300 to \$400 per ton of coal pulverized. The cost of a plant for 250 tons daily capacity of pulverized coal will be from \$250 to \$300 per ton. To the cost of the pulverizing plant must be added the cost of the conveying system to the furnaces, also the storage bins, burners, etc., as well as the air supply. More power is required to convey coal by air at such a velocity as will prevent its filling up in the blast pipes than is used where screw conveyors are installed. The necessity of closing up every leak and the possibility of moisture affecting accumulations in the transmission lines make an air system expensive to operate.

### Steel Plant Installations

Tests made on furnaces of the Calumet Steel Co., burning pulverized coal and used in connection with an 8-in. mill indicated that for scrap material running all the way from small rails 2 ft. in length up to 2-in. billets 6 ft. long, totaling 25,000 lb. daily, the use of pulverized coal costing \$2.65 per net ton as compared to oil at 3 cents per gallon effected a saving in fuel of 49 per cent or \$11.75 a day. In addition it was found that the average scale when oil was used amounted to 5 per cent, whereas when pulverized coal was used there was at least 2 per cent reduction. This 2 per cent reduction showed a daily saving of over \$15, making the total daily saving by the application of pulverized fuel burning equipment \$26.75 and for the year a saving of \$6,019 on this furnace alone.

At the Atlantic Steel Co., there is an installation of a 50-ton open-hearth steel furnace which has now been in operation since November, 1915. It has been aver-

aging around 400 lb. of coal per ton of steel tapped from a cold charge. There are certain conditions which must be met where pulverized coal is burned in open-hearth furnaces previously fired by means of producer gas or oil. They require some change in the conformation of the flues and the installation of removable slag pockets and the rearrangement of the regenerating chambers, eliminating a certain amount of checkers and replacing them by means of baffle walls. The cross sectional area of the flues of the furnace and the checkers must be proportioned properly so that excessive velocity of the gases is not permitted.

The Lackawanna Steel Co. has been modulizing flue dust in an 8x125 ft. rotary kiln. Pulverized coal is used for heating up the kiln and for the ignition flame. It was found that after starting there was a sufficient quantity of carbon in the shape of coke breeze with the flue dust to support combustion after being thoroughly ignited and that the kiln operated continuously without the ignition or pulverized coal flames at the burning end.

#### Use in Open-Hearth and Small Heating Furnaces

In answer to a question raised in the discussion of his paper, Mr. Barnhurst stated that he believed that better results will be obtained in the open hearth with the same quantity of coal when pulverized, one furnace using producer gas and one using pulverized coal, and that the use of pulverized coal will reduce the quantity of fuel required from 30 to 40 per cent as compared with the gas producer. The Atlantic Steel Co., is obtaining good results. The plant has been running for nearly two years. There are a number of large installations in western Pennsylvania, around Pittsburgh, being made on account of the shortage of gas. Coals with ash as high as 17 per cent have been used recently, but these are likely to choke up the checkers, particularly in an installation where the checkers have not been designed for pulverized coal firing but for other fuels. At one plant his company obtained the best test with coal having the lowest per cent volatile matter, which ran down as low as 20 per cent. He believes that steel will be made from anthracite coal which contains 1½ per cent to 2 per cent volatile matter when the furnace is being heated alternately from one end to the other. He said that there is no necessity for making any change in the shape of the furnace proper, that is, the combustion chamber. He prefers a distance of not more than 16 ft. to 18 ft. from the point of entrance of the fuel to the edge of the bath. The velocities should be low when pulverized coal is used because of the erosive effect when too large quantities of coal are fed into the chambers.

He usually allows between 40 and 60 cu. ft. of regenerative volume per ton of steel. With pulverized coal less regenerative brick is used because of the small quantity of air passed through the checkers. From 20 to 25 per cent of the air enters with the coal. His company's design directs the gases first downward, then to swing around and up and then over and down through the checkers. As a result of the changes of direction there is deposited a large percentage of the ash carried in suspension. He recommends a removable slag pocket to take care of this.

Pulverized coal is being used on a number of small heating furnaces. One plant is now putting in a large installation in connection with forging furnaces. A test of a day's run was made. Had hand-fired coal been used, 14,000 lb. would have been consumed, but with pulverized coal only 4880 lb. was needed.

#### Pulverized Coal for Boilers

At the railway shops of the Missouri, Kansas & Texas Railroad for over a year pulverized coal has been used under boilers with satisfactory results. These boilers have been operating continuously day and night and for short periods daily at 150 to 180 per cent rating. Practically no repairs to the furnace arches or walls have been made during the year's operation. Smokeless operation has been accomplished. The flue gas analysis during some of the recent tests has varied from 15 to 17 per cent CO<sub>2</sub>. Coals carrying on an

average of from 10 to 22 per cent of ash with a moisture content varying up to 17 per cent as fired are being burned satisfactorily. The furnace efficiency has been good. Three tests made in June showed a furnace efficiency of 98.4, 98.6 and 99.4 per cent.

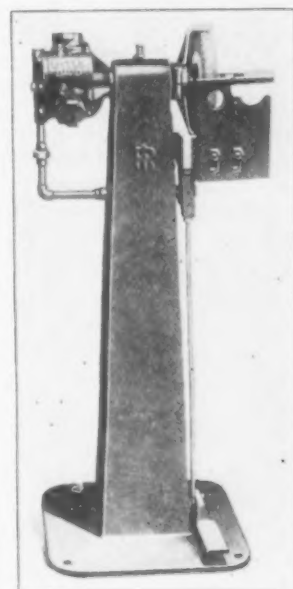
The Sizer Forge Co. is now making an installation of five 250-hp. Rust boilers which will be fired either direct or by using the waste heat from the furnaces. The Stone & Webster Corporation has contracted for coal pulverizing equipment for close to 8000 boiler hp. for the Western Avenue plant of the Puget Sound Electric Light & Power Co., where it is going to replace oil with pulverized coal. It made a series of tests and obtained good results. The American Iron & Steel Mfg. Co. plant at Lebanon has been using waste heat boilers for many years. It has obtained from the pulverized coal-fired furnace between 8 and 9 lb. evaporation per pound of coal fired in the heating and puddling furnaces.

C. C. Smith, taking part in the discussion, related his experiences with powdered coal used on Heine boilers at the McCormick plant of the International Harvester Co., Chicago. The coal used ran from 15 to 20 per cent ash and 20 per cent moisture. Trouble was experienced with ash collecting on the horizontal baffles, but the boilers showed good economy, and the process was successful as long as care was taken to remove the collected ashes. He came to the conclusion that vertical tube boilers were preferable to those with horizontal tubes for powdered coal. He could readily regulate the boilers so that they would either smoke considerably or give no smoke at all. Mr. Barnhurst explained that the combustion chambers of these boilers were probably too small for the quantity of fuel burned.

Replying to a question regarding the use of pulverized coal in small forging furnaces he said that his company allows about 40 cu. ft. in the furnace per pound of combustible burned per minute. He believes that with coals of low melting points this should be increased and that with coals having a high melting point it may be decreased. As a general rule 40 cu. ft. per pound of combustible burned per minute gives a sufficiently low velocity, depending on the shape of the furnace. The burners should also be placed as far from the flues as possible.

#### A Pneumatic Pedestal Grinding Machine

The Ingersoll-Rand Co., 11 Broadway, New York, has developed a stationary pneumatic grinding machine. It is intended for general service where a portable machine would not be entirely satisfactory. The grinding wheel is driven by a three-cylinder motor which receives compressed air at a pressure of 80 lb. and operates at a speed of 3400 r.p.m. The stopping and starting of the grinding wheel, which is 8 in. in diameter, with a 1-in. face, is controlled by a conveniently placed foot lever which regulates the supply of air to the motor.



Compressed Air at a Pressure of 80 Lb. Drives a Grinding Wheel 8 In. in Diameter at a Speed of 3400 R. P. M. in a Recently Developed Machine

The Ford Motor Co., Detroit, has set 900,000 cars as its goal for 1918 production. The factory occupies ground in excess of 350 acres, of which nearly 90 are under cover. More than 36,000 men are employed. During the last fiscal year the output of cars was 780,432.



## PLANS FOR RAIL BUYING

### Director General of Railroads Inquires About Needs for 1918

WASHINGTON, March 5.—The Director General of Railroads has begun a comprehensive survey of the steel-rail requirements of all the railroads of the United States for the year 1918, and in order to secure definite and reliable information on the subject has forwarded to every railroad president in the country an elaborate questionnaire calling for details as to existing contracts, quantities, anticipated deliveries, sources of supply and other pertinent items.

The general purpose of this inquiry, which is being conducted through a division of the Interstate Commerce Commission, is to determine the draft to be made upon the steel industry for the production of rails during the current year, and also to ascertain whether it is possible to institute transportation economies in rail distribution. The scope of the inquiry naturally suggests a pooling project, but the officials disavow any such purpose at this time. Concerning an intimation that it is the purpose of the director general to supervise the rail purchases of the roads either by virtue of his general authority or as the result of the enactment of the Administration's railroad bill, it is semi-officially stated that no such object is now in view, and it is pointed out that the questionnaire does not go into prices or contract conditions other than deliveries.

#### Rail Requirements Large

Taking the railroads of the country as a whole, their rail requirements today are very large, although the urgency of the needs of the various systems is by no means the same. The policy of retrenchment, forced upon the roads as the result of the aggressiveness of shippers and the co-operation of the Interstate Commerce Commission, has induced railroad managers to keep expenditures, even for maintenance of way, at a minimum, and all reserves have been reduced to negligible proportions. The compensation of the roads as fixed by the new legislation promises to be on a scale that will permit all necessary expenditures; in fact, the director general has clearly indicated in semi-official statements that the roads will be required to put their equipment into such shape as will give them the highest possible efficiency. Until the definite plans of the railroad administration have been further developed, however, railroad managers will refrain from any radical departure from the conservative policy heretofore pursued. Extraordinary expenditures to meet emergency conditions have been made during the past four months, and the general disposition among railroad executives is to await the full development of the Government's program before spending any money.

Some of the roads are not in position to plan improvements, or even to take care of necessary maintenance charges, and these systems especially will be vitally interested in the director general's project for providing for carriers which during the past three years have been unable to provide for themselves.

Presidents to whom the questionnaire has been sent are admonished that replies are expected to be made "with all possible dispatch," as it is realized that considerable time will be necessary for the experts of the Interstate Commerce Commission to compile the returns and put the information in shape for the director general's eye. It is unlikely that the data will be in shape to afford a basis of study before April 1.

#### Tonnages for 1917 and 1918

The questionnaire first calls for the gross tonnage of rails put in track during the calendar year 1917. An estimate of the tonnage required for 1918 follows, with a stipulation that the figures shall be so divided as to show separately the requirement for maintenance

and for new construction. That the director general has in mind possible limitations upon the capacity of the rail mills of the country is indicated by an additional inquiry in this connection for the "minimum number of gross tons absolutely required to maintain track in safe condition during the calendar year 1918."

A tabulated summary of contracts made for rails to be delivered during 1918, including amounts due on previous contracts or carried over from contracts of previous years, is called for, the items to be supplied including tonnage, name of vendor, date of expiration of contract, price per ton, section of rail and weight per yard. This table is to be supplemented by a statement of the percentage of quantities contracted for which the carrier expects to receive in 1918, and evidently anticipates a shortage, for a further query is propounded, which calls for a statement of the carrier's plan for obtaining any deficiencies that may develop between the quantities contracted for and those which can now reasonably be expected to be delivered in 1918.

Each carrier is further directed to prepare a detailed statement of all rail mills on its lines, giving the name of the mill and its exact location. With a view to ascertaining what changes have recently been made in the source of rail supply the roads are called upon to state the name and location of every mill from which rails were secured in the calendar years 1916 and 1917.

#### Shortest Hauls from Rail Mills

Taking up the subject of rail distribution, the questionnaire calls for a detailed answer to the question as to what rail mills should provide the carrier to "insure shortest and most economical rail haul," and in this connection railroad executives are admonished that they "should bear in mind that under existing conditions of Government control a long haul on the railroad which uses the rails may not be economical when rails can be obtained via a substantially shorter haul over some other railroad." The questionnaire also calls for a statement of any other reasons which would control the road in question in securing its rail supply from any particular mills, indicating that the Government will give some weight at least to other considerations than that of the most economical rail haul. A final question is whether joints are contracted for simultaneously with rails, and, if so, whether they are procured from the same or different sources.

An accompanying memorandum calls for information concerning railroad cross-ties, including the number used in 1917, the number estimated for 1918 and that actually required to maintain track in safe condition during the present year.

W. L. C.

#### Order Placed for 9000 Steel Wheels

The Forged Steel Wheel Co., Pittsburgh, has been awarded a contract by the Secretary of the Navy for 9000 steel wheels to be delivered to the Philadelphia Rapid Transit Co. The Westinghouse Electric & Mfg. Co. and the General Electric Co. also received orders from the Navy Department for electrical equipment, which is to be given priority. The Navy Department placed these orders to assist in the rehabilitation of Philadelphia's street railways, which lately have given such poor service that it became a matter of Government intervention. Workers at the navy yards were losing time from their work every day because of delays in transportation. The Forged Steel Wheel Co. agreed to begin deliveries of the wheels on March 3, 1918. The price for the 31-in. wheels is \$37.25, as compared with a price of \$19 two years ago. The Midvale Steel & Ordnance Co. and the Carnegie Steel Co., both of which had orders from the Philadelphia company for equipment, had admitted their inability to make deliveries.

Shipment overseas is now being made on heavy trailers built by the Warner Mfg. Co., Beloit, Wis., for motor ammunition trains in France.



# Tests of Browning Machine Guns

Demonstrations of Both the Light and Heavy Types on Feb. 27—Manufacturing at Rapidly Increasing Rates

WASHINGTON, March 5.—Before a large gathering of distinguished public men, army officers, ordnance experts, and foreign military attachés, the new Browning gun was given a remarkable demonstration at the Congress Heights rifle range near Washington, on Feb. 27. At the conclusion of the tests the weapon was pronounced by both American and European experts as the "finest machine gun in the world."

Both light and heavy types of the Browning gun were fired in this test. The light gun was demonstrated by a detail of ten gunners and an equal number of ammunition carriers from the Springfield (Mass.) Machine Gun School. The firing was at wooden butts about the size of a man and at the comparatively short range of 200 yards these were speedily shot to pieces. Rounds were fired in single shots and in semi-automatic and full automatic bursts, the piece being held at hip, shoulder and in prone position. After the firing by the gunners several of the pieces were turned over to members of the Senate and House Military Committees who were present and who fired them from various positions. During the firing of several thousand rounds by the regular gunners and by the Congressional volunteers not a single malfunction occurred. All the gunners agreed that the recoil of the piece is less than that of a 12-gauge double-barreled shot-gun.

The great superiority of the Browning light gun for trench warfare was fully demonstrated by this test. The gun weighs but 15 lb., with magazine loaded with 20 rounds, and is therefore about 11 lb. lighter than the Lewis gun, weighing even less than the light Chauchat gun with which the American troops in the advanced trenches have been temporarily armed. The army officers present were unanimous in the opinion that the Browning light gun would prove an ideal weapon for trench warfare, and especially for arming the first "wave" to be sent "over the top" in raids upon enemy trenches. Other machine guns are so heavy as to impede the progress of the first line of men participating in these rushes, but the Browning gun is so light and so compactly constructed that it can be handled almost as easily as the Springfield rifle, while its automatic magazine fire renders it a most deadly weapon in the hands of a fair marksman.

Following the testing of the light gun two heavy guns were fired, one mounted on a Browning tripod, while the other was fired from a Vickers tripod. While the light Browning gun is air-cooled the heavy type employs a water-jacket. The piece as carried forward by infantry with water-jacket filled weighs approximately 36 lb. The firing test of the heavy gun was also completely successful, both pieces working without a single malfunction. The fact that the tests of both light and heavy guns failed to develop a single jam is regarded not only as a very favorable indication as

to the performance of this weapon in service but also as demonstrating the wisdom of the ordnance experts in adopting a rimless cartridge for the Browning machine gun interchangeable with the Springfield and the modified Lee-Enfield rifles. Upon the conclusion of the test of the two heavy guns they were dismounted, completely dismembered and reassembled in a little more than 5 min., and upon fire being resumed again functioned perfectly.

## To Make 5000 Light Guns Per Week

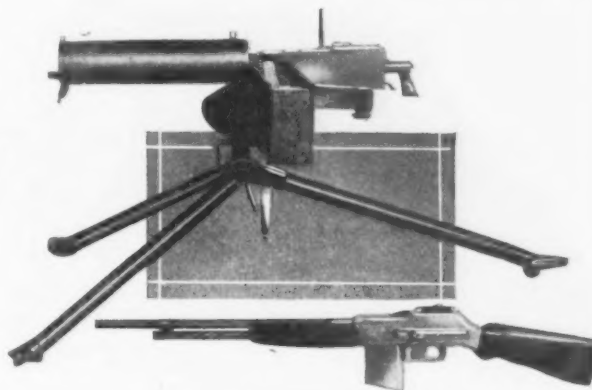
The Browning light machine gun is now being manufactured on a quantity basis by automatic machinery recently completed, the first delivery of 100 of these guns having been made within the past ten days. Three large specially equipped factories are now working on these guns, and deliveries will continue regularly and in increasing volume as shop machines are multiplied and manufacturing personnel developed. It is estimated that peak production will be reached early in June

when about 5000 guns of this type will be turned out each week. In this accomplishment the manufacturers are far ahead of their contract promises to the ordnance bureau, a very gratifying fact in view of past experiences of the Government. Heretofore machine-gun production has rarely met predetermined schedules, owing to the tendency of producers to make contract promises upon the most favorable estimates of the manufacturing situation which, in the case of new machine-gun production, is particularly intricate. It is a matter of great satisfaction to the War Department that there has been no delay in bringing the quantity manufacture of the Browning rifle to a point which promises adequate supplies for the trench warfare of the expeditionary forces and for training in the cantonments.

Production of the heavy type of machine gun, technically known as the Colt-Browning gun and intended chiefly as a defensive weapon, will begin within a few weeks in four factories on a quantity basis by machine processes. Assurances have been received by the Ordnance Department that manufacture of this type will progress on terms favorably comparing with the production now in view for the Browning light gun.

The success of these two guns will add greatly to the reputation of their inventor, John M. Browning, whose achievements as a firearms designer have made his name familiar to the ordnance experts of every civilized country of the world. Mr. Browning has developed half a score of successful guns and rifles, and it is the consensus of opinion, in view of the exacting tests to which both light and heavy types of this new weapon have been subjected since it was adopted as the result of competitive demonstration last May, that the supremacy of the United States Army in this field of equipment is assured.

W. L. C.



FIRST PICTURES OF BROWNING MACHINE GUNS

The water-cooled gun, familiarly called the Browning heavy machine gun, is fed from a belt of 250 rounds of cartridges. In the Government test 39,500 shots were fired without break. At another test 20,000 shots were fired in 48 min. 16 sec., without malfunction and only three stoppages, each due to a defective cartridge. The gun weighs 34½ lb., with the water jacket filled. It operates from a tripod and is effective for overhead, indirect, barrage and defensive fire and similar tactical uses.

The air-cooled gun, familiarly called the light Browning rifle, weighs 15 lb. and may be fired from shoulder or hip, in bursts of 20 rounds or by single shots; fires same ammunition as Springfield or the new modified Enfield rifles; will fire 20 continuous shots in 2½ sec.; cartridge magazine (shown attached beneath the gun just forward of the trigger) can be changed by the rifleman in 2½ sec.

# Falling Off in Iron and Steel Exports

January Total Shows Marked Shrinkage  
and Machine Tools Continue to Decline  
—Increase in Semi-Finished Steel

WASHINGTON, March 5.—The Garfield four-day shut-down, heatless Mondays, fuel shortage, railroad congestion and embargoes, added to scarcity of shipping, forced the total exports of iron and steel in January far below the record level of December, 1917. As compared with January, 1917, however, the losses are not so marked. In contrasting the records of the months of the current calendar year with 1917 the fact must be borne in mind that last year was a banner twelve-month and that some of its records, at least, may stand for a long time.

The total exports of iron and steel by values in January gained less than one-fourth of 1 per cent over January, 1917, and lost 9 per cent as compared with the high record of December, 1917. Shipments of tonnage iron and steel in January fell no less than 18 per cent below those of January, 1917, and did not approach the total of December. The exports of machinery gained but eight-tenths of 1 per cent as compared with January, 1917, and declined 20 per cent as compared with the unprecedented record of December, 1917.

## Machine Tools Still Declining

Exports of machine tools, still on the down grade, declined 35 per cent as compared with January, 1917, and fell no less than 44 per cent short of the record scored in May, 1916.

For the seven months ended January, 1918, the total exports of iron and steel by values gained one-third of 1 per cent as compared with the corresponding period of 1917, which was more than 100 per cent above any previous seven months. Tonnage commodities fell 13 per cent below the high level of the seven months period of 1917. Exports of machinery, however, scored a substantial advance of 20 per cent over the seven months

of 1917, which were approximately 50 per cent in advance of 1916. Shipments of machine tools lost 23 per cent during the seven months ended January as compared with the same period in 1917, which was nearly 100 per cent ahead of the corresponding months of the preceding year.

## Values Equal Preceding January's

The value of all exports of iron and steel products in January was \$108,662,384, as compared with \$108,423,640 for the same month of 1917 and \$51,643,807 for January, 1916. For the seven months ended January, 1918, the aggregate was \$606,607,498, as compared with \$604,574,281 for the same period of 1917 and \$300,965,569 in 1916. Exports of machinery in January were valued at \$24,178,146, as compared with \$23,965,450 for the same month a year ago. The highest total previously recorded was that of December, 1917, when the machinery shipments were valued at \$30,051,092. For the seven months ended January, 1918, the exports of machinery were valued at \$173,691,668, as against \$146,730,247 for the same period of 1917. Shipments of metal-working machinery in January aggregated \$5,504,954, as against \$8,326,609 for the same month of 1917. For the seven months ended January, 1918, the machine-tool exports totaled \$37,425,375, as compared with \$48,657,760 for the same period of 1917. Details of the exports of machinery in January, 1917 and 1918, and for the two seven-months periods are given in the accompanying table.

Exports of iron and steel for which quantities are given aggregated but 495,345 gross tons in January, 1918, as compared with 608,286 tons for the same month of 1917. Shipments in December amounted to 656,044 tons and surpassed all previous records. For the seven

## Exports of Machinery

	January		Seven Months	
	1917	1918	1917	1918
Adding machines	\$142,286	\$125,514	\$851,277	\$1,331,025
Air-compressing machinery	97,492	129,891	686,943	783,000
Brewers' machinery	1,205	39,764	5,629	209,943
Cash registers	124,452	28,507	956,867	302,194
Parts of	10,337	4,671	83,108	43,240
Concrete mixers		*28,771		*183,159
Cotton gins	9,362	7,714	74,274	70,027
Cream separators	39,141	64,976	160,707	285,902
Elevators and elevator machinery	179,358	168,527	1,187,840	1,235,685
Electric locomotives	63,545	4,469	318,848	102,649
Gas engines, stationary	65,527	44,401	290,568	391,516
Gasoline engines	1,626,990	2,505,509	8,420,438	16,306,465
Kerosene engines		*502,781		*2,512,696
Steam engines	943,654	3,737,726	7,784,853	26,037,686
All other engines	336,435	334,727	2,293,990	1,172,754
Parts of	2,532,295		12,005,906	
Boilers		*333,109		*2,815,281
Boiler tubes		*396,636		*5,169,151
All other parts of engines		*1,424,305		*9,959,889
Excavating machinery		*82,534		*580,495
Milling machinery, flour and grist	121,228	114,364	802,350	512,287
Laundry machinery, power	38,004	29,663	185,990	216,875
All other	20,092	168,674	200,791	182,380
Lawn mowers	12,085	22,086	96,320	154,358
Metal-working machinery (including metal-working tools)	8,326,609		48,657,760	*44,604,259
Lathes		*1,425,315		*11,532,680
Other machine tools		*1,048,511		*6,507,611
Sharpening and grinding machines		*662,849		*3,950,337
All other metal-working machinery		*2,368,279		*15,434,747
Meters, gas and water	42,340	23,677	227,564	996,863
Mining machinery, oil well	109,246	195,082	1,322,046	1,232,982
All other	1,048,087	803,758	5,428,135	6,179,921
Paper-mill machinery	149,733	80,576	1,093,769	1,181,727
Printing presses	170,110	136,933	1,218,576	892,232
Pumps and pumping machinery	512,665	508,865	3,588,551	4,009,783
Refrigerating and ice-making machinery	84,749	95,232	453,628	884,101
Road-making machinery		*30,161		*275,105
Sewing machines	522,552	678,584	3,305,364	5,062,016
Shoe machinery	143,973	149,675	740,378	1,043,808
Sugar-mill machinery	932,278	870,557	8,484,985	8,868,276
Textile machinery	277,988	418,728	2,158,392	2,807,734
Typesetting machines	96,977	91,855	631,216	764,898
Typewriting machines	1,151,104	757,575	6,839,798	4,661,614
Windmills	66,697	57,699	465,609	775,224
Woodworking machinery, saw mill	38,876	40,977	283,947	534,706
All other	116,356	99,793	569,604	633,837
All other machinery and parts of	3,811,622	3,484,647	24,854,026	24,902,809
Total	\$23,965,450	\$24,178,146	\$146,730,247	\$173,691,668

\*Not separately enumerated prior to July 1, 1917.  
†Six months ended June 30, 1917.

## Exports of Iron and Steel

	January		Seven Mos.	
	1917 Gross Tons	1918 Gross Tons	1917 Gross Tons	1918 Gross Tons
Pig iron .....	69,146	.....	522,987	.....
Ferromanganese .....	.....	*476	.....	*5,944
Ferrosilicon .....	.....	*583	.....	*7,446
All other pig iron .....	.....	*19,522	.....	*285,362
Scrap .....	23,012	412	136,881	26,145
Bar iron .....	5,172	5,399	39,136	31,013
Wire rods .....	7,468	14,800	84,172	126,220
Steel bars .....	57,359	73,774	465,059	357,986
Billets, ingots and blooms, n.e.s. ....	183,565	195,385	1,094,116	1,180,304
Bolts and nuts .....	3,130	1,846	17,944	19,388
Hoops and bands .....	4,753	203	25,973	36,319
Horseshoes .....	103	512	2,917	7,538
Cut nails .....	288	162	3,153	2,949
Wire nails .....	7,225	8,072	85,194	76,697
All other nails, including tacks .....	1,637	.....	9,942	.....
Cast-iron pipes and fittings, Wrought pipes and fittings, Radiators and cast-iron house heating boilers....	5,157 11,857	6,770 7,689	45,821 113,565	50,035 67,697
Railroad spikes .....	205	246	1,624	2,080
Steel rails .....	2,075	703	10,227	10,933
Galvanized iron sheets and plates .....	76,493	35,824	375,711	252,073
All other iron sheets and plates .....	9,203	6,624	55,050	48,098
Steel plates .....	4,101	3,479	27,014	36,044
Steel sheets .....	38,904	36,222	190,904	292,479
Ship and tank plates, punched and shaped ....	10,304	13,977	65,775	99,209
Structural iron and steel....	.....	*1,254	.....	*20,579
Tin andterne plates.....	19,482	25,368	201,870	155,075
Barb wire .....	23,408	19,959	127,959	125,284
All other wire.....	17,303	8,492	230,989	111,338
Total .....	17,736	13,592	155,822	110,987
Total .....	608,286	495,345	4,089,805	3,544,222

\*Not separately enumerated prior to July 1, 1917.

months ended January, 1918, these shipments aggregated 3,544,222 gross tons, as compared with 4,089,805 tons for the corresponding period of 1917. The accompanying table shows the exports for January and for the seven months ended January, 1918, as compared with 1917.

W. L. C.

## Consignee for Imported Tin and Ferroalloys

The American Iron and Steel Institute, acting for the Government, has appointed the following to act as attorneys for it in customs matters connected with the importations of tin and of certain ores and ferroalloys referred to in THE IRON AGE Dec. 20, 1917:

New York—James T. McCleary, Howard H. Cook, William G. Gray.  
Philadelphia—H. W. Summers, E. K. Bauer, J. F. Harder.  
Baltimore—S. H. Bland, G. F. Medinger, J. D. Boan.  
New Orleans—S. W. Wheelock, James L. Hyde, J. P. Pannill.  
Eagle Pass, Tex.—F. L. Jordan.  
El Paso, Tex.—John A. Wright.  
Laredo, Tex.—Ellis C. Williams.  
Nogales, Ariz.—William T. Haley.  
San Francisco—A. T. DeForest, W. A. Ross, L. H. Korn-dorff, H. F. Wilson.  
Seattle, Wash.—Albert E. Knoff, Edward Bray, Karl S. Harbaugh.

## New Korean Blast Furnaces

The new blast furnaces in Korea were expected to be blown in during February. They have been built by the Mitsubishi Sietitsu Kaisha, Ltd., at Kenjiho, Korea, which has a capital of about \$15,000,000, one-half of which has been paid up. It is a subsidiary of the Mitsubishi Goshi Kaisha. The output is expected to reach 100,000 tons per year.

In view of the consolidation effected on Jan. 1 of the Pacific Hardware & Steel Co. and Baker & Hamilton, San Francisco, the new organization, styled Baker, Hamilton & Pacific Co., has consolidated the Eastern offices of the two old concerns with headquarters at 30 Church Street, New York. This office will be in charge of E. R. Wendemuth, who was formerly connected with the Pacific Hardware & Steel Co. in the same capacity.

The Signal Corps wants 10,000 more machinists, mechanics, chauffeurs, and other skilled workers in the aviation section. Men registered in the draft may be inducted into this service by applying to their local draft board. Others may enlist at any recruiting office.

## SWITCHING CARS IN PLANTS

## Industrial Companies May Not Collect for It from Railroads

WASHINGTON, March 5.—That trunk lines may not make any allowance for switching between points of interchange and points of final placement within the plant of a steel company is an important principle laid down by the Interstate Commerce Commission in a decision just handed down in a case involving the Marting Iron & Steel Co. of Ironton, Ohio. The ruling amplifies materially that made in the original Industrial Railways case.

The Marting company acquired its blast furnace at Ironton in 1899 and maintains about 3½ miles of yard tracks and sidings within its plant inclosure. For the purpose of hauling away slag and other refuse of the plant, and using these waste materials for filling low places on the plant property, the company purchased a locomotive which it used also in performing a large part of the necessary switching of materials to and from the rails of the connecting carriers, the Norfolk & Western and the Detroit, Toledo & Ironton railroads, which extend into and through the plant property. When the filling was completed, in 1902, the company desired to discontinue its locomotive service and called upon the connecting carriers to receive and deliver cars directly at the point of loading or unloading within the plant inclosure, as they did for other furnaces in the same territory. Thereupon the Norfolk & Western and the Detroit, Toledo & Ironton, to avoid the necessity for each of them to maintain a switching engine and a crew at the plant, agreed to allow the company 45c. per loaded car in and out of the plant if it would continue to switch cars from and to the interchange points to and from points within the plant inclosure. This the company agreed to do, although the allowance was less than the actual cost of the service, and the arrangement continued until Dec. 2, 1907, when the allowance by the Norfolk & Western was increased to 60c. per car. Later the same allowance was made by the Detroit, Toledo & Ironton, the Chesapeake & Ohio, and the Cincinnati, Hamilton & Dayton, the two last-named roads reaching the plant by means of trackage rights over the Detroit, Toledo & Ironton. This allowance remained in effect until April 1, 1914, when it was canceled and none has since been made. The company recently asked the commission to order the restoration of the allowance, and that it be applied on cars switched between April 1, 1914, and the date of restoration. In denying the Marting company's request the commission says:

The service performed by the steel company is the switching of cars between the points of loading or unloading within the plant inclosure and the interchange point with connecting carriers, an average distance of 1200 ft. No industries or shippers other than the steel company are served. The movement of material from the stock piles to the furnace is by basket or small electric engine. The ore, coke, and limestone brought in by the trunk lines are spotted by locomotives of the steel company on the trestles over the bins. Cars are interchanged with connecting carriers under the demurrage rule and average agreement.

Upon all the facts of record, we are of the opinion and find that in the operation of its plant tracks the Marting Iron & Steel Co. acts only in the capacity of a plant facility and not as a common carrier; that the placing of cars on the tracks within the plant inclosure designated by the industry constitutes delivery by the trunk lines under their line-haul rate; and that the subsequent service of switching cars from the designated tracks to points of placement within the plant inclosure constitutes an additional movement not covered by the line-haul rate for which an additional charge must be made if the service is performed by the trunk lines.

Conversely, the commission holds, if the service is performed by the industry itself no allowance therefor may with propriety be made to it by the trunk lines.

D. C. Campbell, president Tennessee Manganese Co., Knoxville, Tenn., reports that the company will require an electric furnace of from 25 to 30 tons daily capacity of ore, from which will be made ferromanganese.



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# THE IRON AGE

EDITORS:

A. I. FINDLEY

WILLIAM W. MACON

GEORGE SMART

CHARLES S. BAUR, *Advertising Manager*

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## Steel Market Prospects

It is unfortunate on more than one account that the iron and steel industry has been so completely under the thumb of the railroads. By reason of the completeness of this control, all the other influences, the influences that normally make the market, have been prevented from exhibiting themselves. The fact that a given consumer does not buy is attributable to his inability to operate or to a knowledge that if the purchase were made the movement of the material to his factory would be impossible. The fact that a blast furnace or steel mill does not ship against a given order may be attributable to inability to make the shipment, when if the transportation lines were open its shipping or not shipping would disclose whether or not it had productive capacity available to fill the order.

Another feature of the situation, the bearing of which does not seem to be generally recognized, is that the customer in embargoed territory is assumed to be a customer who wants delivery at once, when possibly he does not. If the rail line were open he might request postponement of shipment, but as it is, he allows the embargo to carry the responsibility and does not show his hand. A condition of this sort has often occurred in past years in the Connellsville coke trade. For a time the movement would be restricted by railroad conditions, and then when free shipments were resumed the operators would suddenly be deluged by requests to suspend or reduce shipments. At the present time all shipments into or through embargoed territory depend either upon certain exceptions prescribed at Washington or upon shipping permits being granted. Such permits must be applied for by the prospective consignee. If a permit is not granted it does not follow that a proper request for permit was refused. It may be that no application was made, or the prospective consumer purposely failed to satisfy the railroad that the material was really needed and could be unloaded promptly. Thus the trade is left largely in the dark on the questions of how much pig iron and steel consumers really require and how much the producers can make in proportion to the requirements.

An analysis of the position and prospects of the

iron and steel industry must therefore rest largely upon theory. On the surface the quantitative method, the appraisal respectively of the tonnage requirements and the tonnage capacity, seems the most attractive, and yet it has rarely been applied successfully in the past. In times of extreme dullness, with mills operating at 50 or 60 per cent of capacity, the application did not fit. It was difficult to see how 50 or 60 per cent of the productive capacity could be passing into consumption when there appeared to be scarcely any demand at all. When, again, mills were running with an overload it has usually been difficult to see how so much material could be consumed.

It may, however, be of interest to cite the figures that bear upon the subject. In 1916 the steel industry operated throughout at its steadily increasing capacity, producing 41,400,000 tons of ingots and 30,500,000 tons of finished rolled steel. The annual compilations of new construction by THE IRON AGE showed 8,000,000 tons of rated ingot capacity added in the two years 1916 and 1917. A limited portion of the new capacity contributed to the 1916 output, which would have been about 40,000,000 tons without it, so that existing capacity may be taken at about 48,000,000 tons, with a little new capacity on the way. The production of finished rolled steel always runs almost exactly three-fourths of the ingot production, so that capacity in finished rolled steel is to be taken at about 36,000,000 tons, or 3,000,000 tons a month.

In 1916 the exports of steel returned by weight, of course excluding pig iron and castings, as the analysis of capacity refers to steel only, amounted to about 5,200,000 tons. An allowance of approximately 1,800,000 tons may be made for steel consumed in making export commodities not returned by weight, including loaded and unloaded shells, railroad rolling stock, machinery, etc., and in new construction and equipment of factories depending solely upon export trade. That would involve a total deduction of 7,000,000 tons from the production of rolled steel of 30,500,000 tons, leaving 23,500,000 tons as the purely domestic consumption.

In 1916 there were exports of considerable magnitude to neutral countries. For some time to come such exports will be extremely light. Exports to our allies will be as heavy as possible, but it is

improbable they will involve 7,000,000 tons. Assuming 6,000,000 tons, the productive capacity remaining would be 30,000,000 tons, on the basis of full operation. This would be divided between the war requirements, direct and indirect, of the Government, and the purely peace or commercial consumption of domestic consumers.

It seems very difficult to allot this tonnage to peace requirements and war requirements respectively, but here the tonnage analysis really breaks down completely, because one item of peace consumption after another has been taken over by the war. The automobile factories are making trucks. The structural shops are helping in shipbuilding. Last and most important, the railroads, always the most important single customer of the steel industry, disappear, and the United States Government takes their place as a buyer of locomotives, cars and other railroad material. While it appears to be impossible to allot the tonnage in such a way as to absorb it, the fact does not furnish a conclusion. It scarcely does more than raise a suspicion that if capacity operation of the steel industry is possible there will be an ample supply.

There are other angles, however, from which the matter may be viewed. There is the fact that while for three months the steel industry has not produced and shipped at a rate of more than two-thirds of its capacity there is no serious shortage of steel at the consuming plants engaged in war activity. Rather there are various reports of stocks of steel accumulated beyond current requirements. Steel mills have had many experiences of being asked to rush shipment for Government account, only to find later that the material could have been shipped much more leisurely without interfering with the consuming operation. These consuming activities will be speeded up, but the idle steel making capacity of the past three months constitutes a formidable reserve, if it can be brought into operation.

From still another angle some illumination may perhaps be had. The steel industry is highly specialized as to the class of finished rolled product into which it can convert its raw product. It cannot convert all its ingots into rails, or into merchant bars or into plates. Indications are that as to war requirements there are two distinct stages—preparation for waging war and actually conducting war. In the first stage a very wide variety of steel products is required—nails and pipe for army cantonments, structural steel for shipyard building, and similar items of construction. In actually waging war there will be steady streams of shells, motor trucks, airplanes, shipbuilding material, and the like. In the first stage, now largely passed, there is a great diversity. In the second stage there is a strong trend towards specialization. The specialized steel finishing industry will have broad lines of contact with the specialized war consumption. Across those lines there will be a full flow of material. Also there will be great gaps, finished material the steel industry can make but which the prosecution of war cannot consume. The forms of steel thus represented may become quite plentiful.

In the appointment of Mr. Baruch to be chairman of the War Industries Board, and in conferring

a large measure of control of the country's industries, an important departure has been taken and the steel industry can be counted upon to do its full share in making the plan a success.

### War Work in the Open

The facts presented with respect to conduct of the work of war appear very confusing. Day after day news is presented that we have fallen down, or are about to fall down, in one respect or another. Then there are rejoinders that we are really doing very well. Perhaps it will help toward a realization of the true situation to notice that there is to-day a great deal more publicity than was given or was expected, in times past. Our troubles are brought into the open and perhaps we are magnifying some of them. It is much better at any rate that conditions should be openly discussed than that they should be kept quiet and the public learn too late that things have been going wrong.

An interesting and common procedure is for one war activity or another to be brought forward in the daily press with statements that some other war activity is not doing its part; then the other war activity promptly comes forward and asserts that it is. It looks rather bad on the surface, for why should they not get together? However, they are taking the public into their confidence, and a spirit of rivalry is shown that in the ordinary walks of life is usually regarded as highly desirable for the production of results.

The public is being made quite familiar with the work that is necessary to bring the best results. The people have a part in much of the effort and the more they know of the difficulties the more they are likely to do individually to help. One does not observe that the publicity given to various shortcomings in the general work of prosecuting war causes the people to become discouraged. There is, after all, practically no note of faultfinding in proportion to the magnitude of the work being done. There is no discouragement. There may be discontent, but discontent has had much to do with the world's progress in the past.

Again it seems rather puzzling to learn concerning one thing after another, almost without end, that it is the thing that "will win the war." Neither does this do any harm. Necessarily, it must be a species of exaggeration, but it is all helpful in keying up the people. Just for good measure, it might be observed that after all it is the people who will win the war. They are being informed of the troubles and difficulties. The war work is being done in the open and that is decidedly a good thing.

### Labor and the New Order

The radical labor element of the United States has not formulated as yet any definite program for the social and industrial reorganization which many predict must follow the war. In England, where study has been given to war and peace problems for a longer time, the Labor party has announced a tentative program of reconstruction which is frankly socialistic in all of its aims. Some of the



reforms sought in England may come eventually to a degree in this country, but the progress of such radicalism will be slower here, first, because the radical elements are not as thoroughly united as in England and, second, because while we have our social ills, they are not aggravated as in England. Labor here has been much better paid, has far more of the comforts of life and in the main is more contented.

The tentative platform of the British Labor party is divided into four striking proposals, which may be summed up as follows: (a) A minimum wage, (b) control of industry for the benefit of the community, (c) taxation of large incomes amounting practically to conscription, and (d) diversion of surplus wealth or profits for the common good.

The party holds it to be the duty of the government to provide suitable employment, after the war, for all of the soldiers who return and for the munition workers who will be suddenly thrown out of employment. "Any government," the platform reads, "which should allow the discharged soldier or munition worker to fall into the clutches of charity or the Poor law would have to be instantly driven out of office by an outburst of popular indignation." It goes on to say that "the work of re-settling the disbanded soldiers and discharged munition workers into new situations is a national obligation."

It is further held to be the duty of the government to provide employment for all who are willing to work. "In so far as the government fails to prevent unemployment—whenever it finds it impossible to discover for any willing worker, man or woman, a suitable situation at the standard rate—the Labor party holds that the government, in the interests of the community as a whole, must provide him or her with adequate maintenance, either with such arrangements for honorable employment or with such useful training as may be found practicable, according to age, health and previous occupation."

The party demands "the progressive elimination from the control of industry of the private capitalist, individual or joint-stock, and the setting free of all who work, whether by hand or brain, for the service of the community, and the community only." That there may be no doubt of the purpose to do away with the present industrial system, it is declared that "what the Labor party looks to is a genuinely scientific reorganization of the nation's industry, no longer deflected by individual profiteering, on the basis of the common ownership of the means of production; the equitable sharing of the proceeds among all who participate in any capacity and only among these, and the adoption, in particular services and occupations, of those systems and methods of administration and control that may be found in practice best to promote the public interest."

It goes without saying that the party stands for public ownership of railroads, mines, production of electrical power, etc. It stands for national insurance by the government, for the complete control and licensing of the sale of liquor; for the control of prices on certain staple articles such as coal and other standardized products, even including food.

A system of taxation is advocated which will "yield all the necessary revenue to the government

without encroaching on the prescribed national minimum standard of life of any family whatsoever; without hampering production or discouraging any personal effort, and with the nearest possible approximation to equality of sacrifice." All proposals for a protective tariff are rejected; also all taxation which would increase the price of food or any other necessary of life, and it is held that direct taxation of any kind should be limited to luxuries. For the raising of a great part of the revenue for government needs the party looks to the direct taxation of incomes above the necessary cost of family maintenance; it also stands for an inheritance tax which would divert to the national exchequer all private riches in excess of a quite moderate amount by way of family provision.

In advocating appropriation of surplus of wealth for the common good the British Labor party says that the riches of the mines, the extra profits of fortunate capitalists and even the material outcome of scientific discoveries must be taken over by nationalization, by municipalization and by steeply graduated taxation of private incomes and riches.

Legislation in Great Britain has long been heading toward state socialism, so that some of the proposals of the labor party represent no great strides on that road. Others are revolutionary, but that does not signify that the conservative forces in Great Britain can prevent their getting on the statute books. The British Labor party is strong and growing stronger, and unless opposed by a coalition of Liberals and Conservatives may elect a majority in the House of Commons in the next general election.

It would be a mistake to believe that with all the differences between labor conditions in the United States and in Great Britain, industry in this country can escape readjustment after the war. Having thrown everything into the balance in the war for democracy in government, it would be strange if the people of the United States came out of the war without any concessions to the growing demand for more democracy in industry. Yet many employers seem to be acting on the fatuous belief that the military system in industry can survive militarism in government.

#### American Foundrymen to Meet in Milwaukee

Milwaukee has been selected as the place for the 1918 convention of the American Foundrymen's Association and the American Institute of Metals. Concurrent with these meetings will be the exhibition of foundry equipment, machine tools and accessories. The convention will take place the week beginning Monday, Oct. 7, and will continue throughout the week.

The committee of the American Foundrymen's Association empowered to decide upon the time and place of the 1918 convention and exhibition, which met in Milwaukee several days, comprise President Benjamin D. Fuller, Westinghouse Electric & Mfg. Co., Cleveland; C. E. Hoyt, exhibition manager, Chicago; H. R. Atwater, Cleveland Osborn Mfg. Co., Cleveland; S. T. Johnston, S. Obermayer Co., Chicago; V. E. Minich, Sand Mixing Machine Co., New York, and A. O. Backert, secretary-treasurer, Cleveland.

The Philadelphia Chamber of Commerce will suggest a plan to the United States Government of taking over the Hog Island shipyard of the American International Shipbuilding Corporation and making it a part of the Philadelphia Navy Yard.



## GUARDING WAR WORK PLANTS

## Government Cannot Undertake It—Measures of Protection from Within

WASHINGTON, March 5.—The War Department has decided that it is impracticable and unwise to attempt to furnish armed guards for industrial plants having war contracts, as a protection against incendiaryism and alien enemy activities. Hundreds of requests for guards ranging in size from two or three men to a company or more have been received from plant managers in all parts of the country.

"Often a guard may be needed for the safety of a factory," says Secretary Baker in an official statement concerning the department's policy, "and when it is, it should be supplied by the owner of the factory, by the municipality or by the State. Recent events have shown that the greatest danger is from within, and it is from within that the movement for protection must come." After careful investigation, the officers of the Intelligence Department of the Army and agents of the Department of Justice are a unit in advising that certain measures of internal protection be adopted by each company. These measures are summarized as follows:

Each factory should have a superintendent of personnel and plant protection, with these functions:

1. Each day, and, if possible, more than once a day, he should make, or direct to be made, a minute examination of the plant from roof to cellar, and especially those seldom visited places where an intruder might lurk or where an accumulation of inflammable material or waste might be thrown. This general inspection is of the greatest importance, and should be supplemented by the floor bosses and sub-bosses, the senior in charge making a detailed inspection of his floor and reporting to the personnel and plant protection officer at frequent intervals and always at the beginning and end of the day and at noon.

2. A careful scrutiny should be made of the workers as they enter in the morning and leave at night, and particular attention should be paid to those leaving at odd hours. All should be provided with signed identification cards or other device, supplemented by signed cards, alphabetically arranged, the loss of which should cause the man to be discharged.

3. The personnel and plant protection officer should tabulate or card catalog the employees to an extent sufficient to enable him to know who are the really loyal citizens as distinguished from those who are possible sources of danger.

4. In discovering the would-be mischief maker, no help can be so effective as that of the loyal employee. To this end the personnel officer should, as quickly as possible, enlist the services of the more intelligent and unquestionably loyal, especially those who have sons or other relatives in the Army. It should be made clear to them that in guarding the factory in which they work they are rendering to the country a service of equal importance and greater effectiveness than that rendered by sentries on guard.

In meeting the suggestion that such an organization as that outlined above will add to the legitimate cost of production, Secretary Baker says that, aside from any question of patriotic duty to keep the output of all materials at its highest pitch and to preserve every resource of the country for the prosecution of the war, it is clear that the expenditures would probably be less than the increase in fire insurance rates which will inevitably follow the destruction of a number of plants through carelessness or other causes.

## To Work with Government Purchasing Agents

The Manufacturers' Council of New Jersey, Trenton, has been incorporated for the purpose of co-ordinating the industrial resources of the State and placing them at the disposal of the Government. The organization will operate independently of the New Jersey State Chamber of Commerce, with which it was first planned to affiliate, and will establish a bureau at Washington to provide members with information as to the Government's needs and to assist the purchasing agents of the Government. The officers elected for the ensuing year are: President, Warren C. King, president King Chemical Co., Bound Brook; first, second and third vice-presidents, Colonel Austen Colgate, Colgate & Co., Jersey City; Henry C. Lovis, president Seabury & Johnson, East Orange, and Peter Smith, president Barbour Flax Spinning Co., Paterson, respectively. Arthur E. Barlow, president Barlow Foundry, Inc., Newark, is treasurer, and George E. Hoffman, secretary Monument Pottery Co., Trenton, is secretary.

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## SOME GAIN IN PIG IRON

### February Production 2,319,399 Gross Tons

#### Net Increase of Fourteen Stacks—Chicago Leads in Recovery—Ferro Output Low

The pig-iron production in February was 2,319,399 gross tons, a daily rate of 82,835 tons as against 77,799 tons in January, or a gain of about 6.5 per cent. in the rate of output. The most marked recovery was in the Chicago district, where the average daily output of 10,557 tons shows 32 per cent advance over the January rate of 7,990 tons per day. In the Pittsburgh territory the daily rate increased from 16,145 tons in January to 16,889 tons in February, a gain of only 4.6 per cent. The net increase in active furnaces was fourteen, 27 being blown in and 13 blown out.

#### Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from February, 1917, is as follows:

Daily Rate of Pig-Iron Production by Months—Gross Tons			
	Steel Works	Merchant	Total
February, 1917.....	65,280	29,193	94,473
March .....	73,731	31,132	104,863
April .....	79,031	32,134	111,165
May .....	77,561	32,677	110,238
June .....	76,805	32,197	109,002
July .....	76,440	31,380	107,820
August .....	71,436	33,336	104,772
September .....	73,290	31,175	104,465
October .....	76,664	29,886	106,550
November .....	77,135	29,724	106,859
December .....	66,605	26,392	92,997
January, 1918 .....	55,662	22,137	77,799
February .....	56,938	25,897	82,835

#### Production of Steel Companies

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies show the following totals of steel-making iron month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons			
	—Pig, total production—		
	1916	1917	1918
Jan. ....	2,251,035	2,244,203	1,725,513
Feb. ....	2,183,845	1,829,846	1,594,140
Mar. ....	2,365,116	2,285,430	.....
Apr. ....	2,316,768	2,370,937	.....
May ....	2,408,890	2,404,380	.....
June ....	2,295,784	2,304,155	.....
July ....	2,306,303	2,369,630	.....
Aug. ....	2,313,122	2,214,513	.....
Sept. ....	2,309,710	2,198,705	.....
Oct. ....	2,530,806	2,376,589	.....
Nov. ....	2,404,210	2,314,857	.....
Dec. ....	2,294,620	2,064,757	.....

Among the furnaces blown in in February were No. 7 Lackawanna in the Buffalo district, Topton in the Schuylkill Valley, two Steelton in the lower Susquehanna, Lebanon Valley furnace, Carrie, two Duquesne and one Monongahela in the Pittsburgh territory, Atlantic in the Shenango Valley, one Johnstown in western Pennsylvania, three Ohio stacks and Hannah in the Mahoning Valley, two Central and one National Tube in central and northern Ohio, Wellston in the Hanging Rock region, one Calumet, one Joliet and one Iroquois in the Chicago district, one Pueblo in Colorado, and Rockdale in Tennessee.

The list of furnaces blown out includes No. 2 Donner in the Buffalo district, Genesee at Charlotte, N. Y., Lebanon stack in the Lebanon Valley, two Aliquippa in Pittsburgh territory, one Shenango in the Shenango Valley, one Watts in Kentucky, one Bellaire in Wheeling district, one Haselton and one Youngstown in the Mahoning Valley, River furnace in Ohio, Thomas stack in Wisconsin, and one Sloss-Sheffield in Alabama.

#### Capacity in Blast

The following table shows the daily capacity in gross tons of furnaces in blast March 1 in the different districts, also the number of furnaces in blast Feb. 1. Estimates of capacity in blast by districts Feb. 1 were omitted because conditions were so unprecedentedly

abnormal owing to transportation and fuel breakdowns that no approximation to the probable average performance of the furnaces in February could be made. The estimate of daily capacity active on March 1 is based largely on February performance. With fair weather conditions it is likely to be improved upon in March.

#### Coke and Anthracite Furnaces in Blast

Location of furnaces	Total number of stacks	Number in blast	Capacity per day	Number in blast	Capacity per day
<b>New York:</b>					
Buffalo .....	19	17	5,353	17	.....
Other N. Y. ....	4	2	219	2	.....
New Jersey .....	4	4	536	4	.....
Ferro .....	1	0	.....	1	.....
<b>Pennsylvania:</b>					
Lehigh Valley..	21	12	3,232	12	.....
Spiegel .....	2	2	176	2	.....
Schuylkill Val..	13	8	2,017	7	.....
Spiegel .....	0	1	50	1	.....
Lower Susque..	8	7	1,411	4	.....
Spiegel .....	2	1	90	2	.....
Lebanon Val....	8	5	203	.....	.....
Ferro and .....	3	1	30	3	.....
Pittsburgh dist..	53	43	16,471	41	.....
Ferro and .....	4	2	304	2	.....
Shenango Val. ...	19	15	4,401	15	.....
Western Pa. ...	25	20	4,856	18	.....
Ferro and .....	3	1	34	2	.....
Spiegel .....	4	3	891	3	.....
Maryland .....	14	9	2,555	10	.....
Wheeling dist. ...	14	9	2,555	10	.....
<b>Ohio:</b>					
Mahoning Val..	26	22	8,103	20	.....
Central and .....	26	21	7,173	19	.....
Northern .....	26	21	7,173	19	.....
Hock. Val., H'g R'k & S. W. ....	17	15	1,967	14	.....
Ohio .....	38	31	10,448	29	.....
Illinois and Ind..	1	2	169	1	.....
Ferro .....	12	9	2,474	10	.....
Mich., Wis. and Minn. ....	12	9	2,474	10	.....
Col., Mo. and Wash. ....	7	6	1,414	5	.....
Ferro .....	1	0	.....	1	.....
<b>The South:</b>					
Virginia .....	16	14	1,536	13	.....
Ferro .....	3	1	25	2	.....
Kentucky .....	7	7	.....	4	.....
Alabama .....	37	32	7,485	33	.....
Ferro .....	1	0	.....	1	.....
Tenn. and Ga. ...	16	11	1,017	10	.....
Total .....	415	324	84,640	310	.....

#### Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces in December and the three months preceding:

Monthly Pig-Iron Production—Gross Tons				
	Nov. (30 days)	Dec. (31 days)	Jan. (31 days)	Feb. (28 days)
New York .....	188,760	175,999	168,467	153,184
New Jersey .....	28,205	19,495	18,296	15,616
Lehigh Valley .....	110,758	106,760	110,285	93,502
Schuylkill Valley .....	80,121	60,949	41,913	46,600
Lower Susquehanna and Lebanon Valley .....	91,022	69,228	49,089	38,094
Pittsburgh district .....	663,909	619,870	500,497	472,904
Shenango Valley .....	148,617	133,480	113,531	113,940
Western Pennsylvania .....	203,256	184,520	150,710	137,576
Maryland, Virginia and Kentucky .....	93,653	81,480	79,433	76,328
Wheeling district .....	112,685	86,621	82,752	61,547
Mahoning Valley .....	274,788	247,191	232,337	226,469
Central and Northern Ohio .....	266,718	230,575	204,527	188,423
Hock. Val., Hang. Rk. & S. W. Ohio .....	66,334	51,350	53,102	54,579
Chicago district .....	481,537	432,028	247,702	295,398
Mich., Minn., Mo., Wis. Col. and Wash. ....	112,266	113,350	112,225	106,660
Alabama .....	251,694	237,227	219,167	209,586
Tennessee and Ga. ....	31,471	32,795	27,735	28,993
Total .....	3,205,794	2,882,918	2,411,768	2,319,399

#### The Record of Production

Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1913—Gross Tons					
	1914	1915	1916	1917	1918
Jan. ...	1,885,054	1,601,421	3,185,121	3,150,938	2,411,768
Feb. ...	1,888,670	1,674,771	3,087,212	2,645,247	2,319,399
Mar. ...	2,347,867	2,063,834	3,337,691	3,251,352	.....
Apr. ...	2,269,655	2,116,494	3,227,768	3,334,960	.....
May ...	2,092,686	2,263,470	3,361,073	3,417,340	.....
June ...	1,917,783	2,380,827	3,211,588	3,270,055	.....
July ...	1,957,645	2,563,420	3,224,513	3,342,438	.....
Aug. ...	1,995,261	2,779,647	3,203,713	3,247,947	.....
Sept. ...	1,882,577	2,852,561	3,202,366	3,133,954	.....
Oct. ...	1,778,186	3,125,491	3,508,849	3,303,038	.....
Nov. ...	1,518,316	3,037,308	3,311,811	3,205,794	.....
Dec. ...	1,515,752	3,203,322	3,178,651	2,882,918	.....
Total .....	23,049,752	29,662,566	39,039,356	38,185,981	.....

\*These totals do not include charcoal pig iron. The 1917 production of this iron is estimated at 400,000 tons.

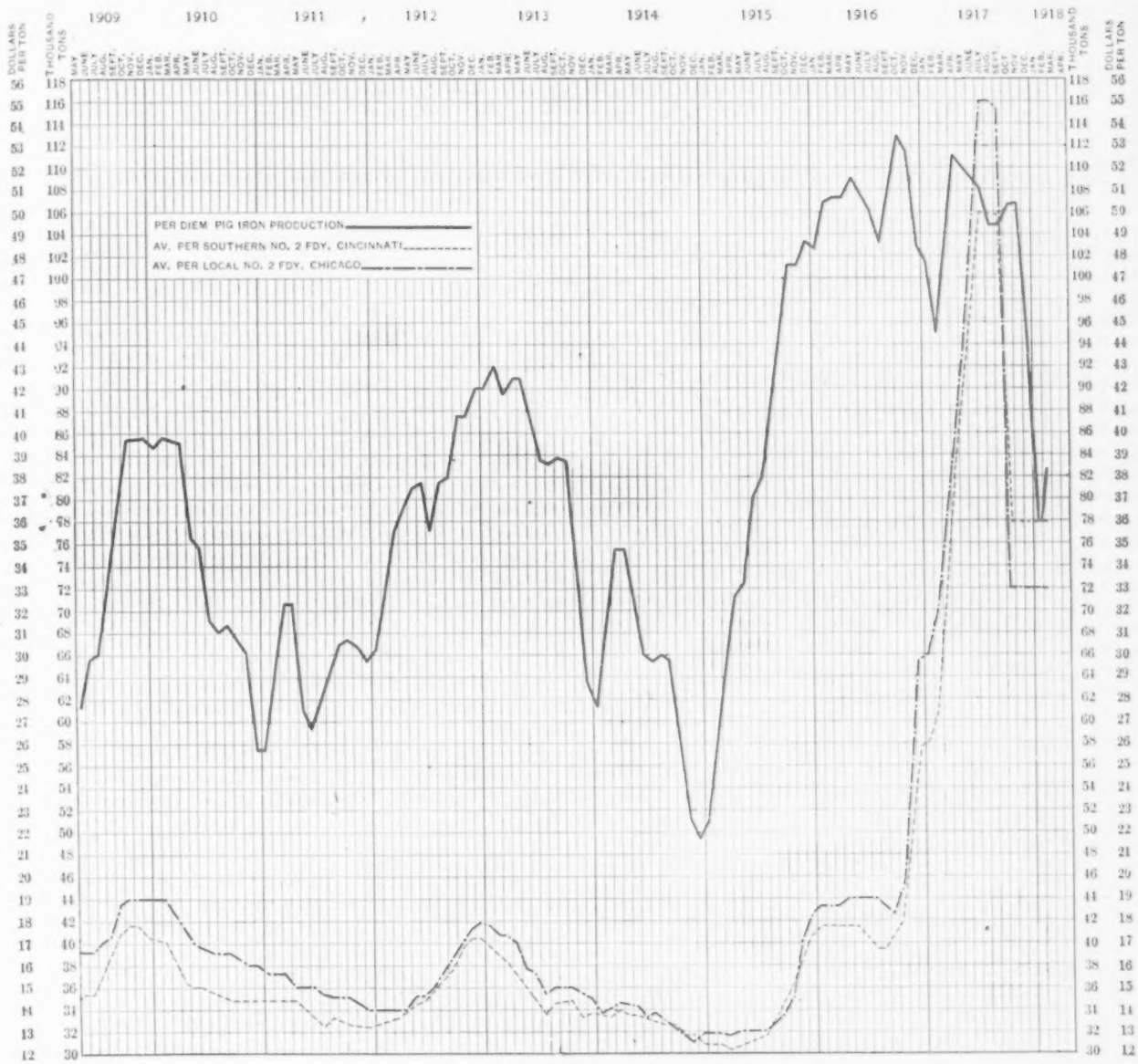


Diagram of Daily Average Production by Months of Coke and Anthracite Pig Iron in the United States from May 1, 1909, to March 1, 1918; Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron at Chicago District Furnace

The figures for daily average production, beginning January, 1911, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1910— Gross Tons								
	1911	1912	1913	1914	1915	1916	1917	1918
Jan.	56,752	66,384	90,172	60,808	51,659	102,746	101,643	77,799
Feb.	64,090	72,442	92,369	67,453	59,813	106,456	94,473	82,835
Mar.	70,036	77,591	89,147	75,738	66,575	107,667	104,882	.....
Apr.	68,836	79,181	91,759	75,665	70,550	107,592	111,165	.....
May	61,079	81,051	91,039	67,506	73,015	108,422	110,238	.....
June	59,585	81,358	87,619	63,916	79,361	107,053	109,902	.....
July	57,841	77,738	82,601	63,150	82,691	104,017	107,820	.....
Aug.	62,150	81,046	82,057	64,363	89,666	103,346	104,772	.....
Sept.	65,903	82,128	83,531	62,753	95,085	106,745	104,465	.....
Oct.	67,811	86,722	82,133	57,361	100,822	113,189	106,550	.....
Nov.	66,648	87,697	74,453	50,611	101,244	110,394	106,859	.....
Dec.	65,912	89,766	63,987	48,896	103,333	102,537	92,997	.....

Diagram of Pig-Iron Production and Prices

The fluctuations in pig-iron production from May, 1909, to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of daily average production by months of coke and anthracite iron. The two other curves on the chart represent monthly average prices of Southern No. 2 foundry pig iron at Cincinnati and of a local No. 2 foundry iron at furnace at Chicago. They are based on the weekly market quotations of THE IRON AGE.

No. 2 furnace of the Wharton Steel Co., Wharton, N. J., was blown in this week and three furnaces are now in operation.

Gear Makers to Meet

The second annual convention of the American Gear Makers' Association will be held in the Green Brier Hotel, White Sulphur Springs, W. Va., on April 18, 19 and 20. The principal subject to be discussed will be "Gear Standardization," and there will also be an address by a representative of the United States Chamber of Commerce, of which body the Gear Association has become a member.

The convention will begin with meetings of committees on Thursday, April 18 at 1.30 p. m. The first session will open with an address by F. W. Sinram, president, on "American Gear Makers' Association, Past, Present and Future." This will be followed by the address by the Chamber of Commerce representative, after which C. T. Poole will talk on "Hardening and Heat Treating of Gears," and B. W. Waterman will present the report of the standardization committee.

The session Friday morning, April 19, will include reports of officers and committees, election of nine members of the executive committee and miscellaneous business. An informal banquet will be held in the evening.

On Saturday morning, April 20, a paper on "Uniform Cost Accounting" will be presented by J. H. Dunn and on "Hobs and Hobbing Machines" by a representative of the Barber-Coleman Co. A program of sports and amusements has been arranged.



# Iron and Steel Markets

## DIVERSE VIEWS ON PRICES

### Smaller Producers Contend for Advances

#### Some Gain in Pig Iron Output, but 1919 May Not Equal Last Year

The New York conference of iron and steel manufacturers on March 1, attended by about 75 representatives of the industry, brought out plainly the divergent interests of large and small producers, as affected by Government prices. While the Steel Corporation and some of the larger independent companies would probably accept without complaint a continuance of present prices, smaller producers in several lines, notably plates, show advances in cost on which they contend strongly for higher Government prices after March 31.

The increased costs of some large companies were as much as \$6 a ton between Dec. 31 and Jan. 31, and when account is taken of today's restricted scale of operations, the increase since the first announcement of Government prices late in September is put in some cases as high as \$10 a ton.

For the Washington conference with the War Industries Board, which will probably be in the third week of March, various manufacturers are preparing individual statements showing the reduced profits of recent operation and the prospect of a very considerable falling off in 1918 from the results of 1917.

Consumers of iron and steel have thus far taken no steps to have their varied interests represented at Washington. There has been some agitation on behalf of Northern users of Southern pig irons for a reduction in such irons so that they may be had at delivered prices comparing with those of Northern irons.

What is increasingly commented on in the trade is the small volume of buying for uses having no connection with the war. Some forms of finished steel may become quite plentiful, and the question is raised whether in these the Government maximum prices may not in time feel the effects of competitive selling.

Pig iron production in February made a gain of about 5000 tons a day over the low rate of January. For the 28 days the total was 2,319,399 gross tons, or 82,835 tons a day, against 2,411,768 tons in January, or 77,799 tons a day. The second half of February made up in part for the serious curtailment of output in the first ten days of the month.

Twenty-seven furnaces blew in in February and 13 went out; thus the 324 furnaces active March 1 represents a net gain of 14. The estimate of active capacity March 1 is 84,640 tons a day, but this is based largely on February performance and good weather in March should show a considerable increase on this rate.

However, there is little faith among producers in the ability of the country's blast furnaces and steel plants to equal in 1918 their performance of last year. The dislocation of transportation and production, due to the way in which control has been

exercised at Washington, has been so great that normal working is not expected for many weeks.

Some plate producers are proceeding on the belief that any change in prices will be upward. On any current orders, as distinguished from contracts, a proviso is made that unshipped parts of an order will be subject to any price change for the period after March 31. Governmental records give the country a plate capacity not far from 6,000,000 tons of 3/16 in. and thicker, and indicate a surplus of plates for shipbuilding in two or three months.

With rail mills generally operating half on shell steel and half on rails, it is not surprising that deliveries now made are six months late. Two large rail producers have established a price of \$60 per ton, either Bessemer or open hearth, but have sold no large amounts at this level. It appears that there is all of 200,000 tons of bought-and-paid-for 67½-lb. Russian rails still in this country, and Government acquisition of these rails is now regarded likely.

The canvass of rail requirements of all the railroads now being made from Washington is chiefly interesting to the rail mills from the standpoint of 1919 needs, as nearly all roads covered for their 1918 requirements months ago. Concerning cars and locomotives, the expectation is general that heavy orders will come from the Government within 60 days. The effort to devise a standard steel freight car indicates standardized prices for car wheels, axles, and other parts.

Light is thrown on the relation of prices on current shipments from mills to official prices by the puddlers' wage settlement as of March 1. A 3.10c. average on bar iron was shown for January and February, as against 2.95c. in November and December.

The trade questions the necessity for such control of tin as is asked for by the Food Administration. So far as tin plate producers are concerned there has been the fullest co-operation in every plan proposed at Washington for the limitation of the use of tin plate to war essentials.

The new freight rates to Pacific Coast points, which go into effect March 15, carry increases, for example, of \$5 per ton on cast-iron pipe to California and \$6 to Oregon and Washington.

## Pittsburgh

PITTSBURGH, March 6—(By Wire).

At the meeting of steel manufacturers held in New York, March 1, several of the larger steel companies reported that their costs in December and January went up \$6 per ton or more. Most of the steel manufacturers present expressed the opinion that a continuance of present price schedules would be best for all concerned, but a few manufacturers contended strongly that on their lines of products prices were too low and should be advanced. A strong argument was made for an advance on wire and wire nails and on other lighter forms of steel. It was the consensus of opinion that the demand for steel products from the general trade is extremely quiet and some plants not working on war materials are not operating to more than 50 per cent. of capacity.

## A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics  
At date, one week, one month, and one year previous

### For Early Delivery

Pig Iron,	Mar. 6 1918	Feb. 27 1918	Feb. 6 1918	Mar. 7 1917
Per Gross Ton:				
No. 2 X, Philadelphia....	\$34.25	\$34.25	\$34.25	\$34.75
No. 2, Valley Furnace....	33.00	33.00	33.00	36.00
No. 2 Southern, Cinti....	35.90	35.90	35.90	29.90
No. 2, Birmingham, Ala.	33.00	33.00	33.00	27.00
No. 2, furnace, Chicago*	33.00	33.00	33.00	34.00
Basic, deliv., eastern Pa.	33.75	33.75	33.75	30.50
Basic, Valley furnace....	33.00	33.00	33.00	30.00
Bessemer, Pittsburgh...	37.25	37.25	37.25	36.95
Malleable Bess., Chicago*	33.50	33.50	33.50	34.00
Gray forge, Pittsburgh...	32.75	32.75	32.75	31.95
L. S. charcoal, Chicago..	37.50	37.50	37.50	35.75

Billets, etc.	Mar. 6 1918	Feb. 27 1918	Feb. 6 1918	Mar. 7 1917
Per Gross Ton:				
Bess. rails, heavy, at mill.	55.00	55.00	55.00	38.00
O.-h. rails, heavy, at mill.	57.00	57.00	57.00	40.00
Bess. billets, Pittsburgh..	47.50	47.50	47.50	65.00
O.-h. billets, Pittsburgh..	47.50	47.50	47.50	65.00
O.-h. sheet bars, P'gh....	51.00	51.00	51.00	65.00
Forging billets, base, P'gh.	60.00	60.00	60.00	90.00
O.-h. billets, Philadelphia.	50.50	50.50	50.50	65.00
Wire rods, Pittsburgh...	57.00	57.00	57.00	80.00

### Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Irons bars, Philadelphia..	3.685	3.685	3.685	3.409
Irons bars, Pittsburgh...	3.50	3.50	3.50	3.50
Irons bars, Chicago.....	3.50	3.50	3.50	3.00
Steel bars, Pittsburgh...	2.90	2.90	2.90	3.25
Steel bars, New York....	3.095	3.095	3.095	3.419
Tank plates, Pittsburgh..	3.25	3.25	3.25	5.00
Tank plates, New York..	3.445	3.445	3.445	5.169
Beams, etc., Pittsburgh..	3.00	3.00	3.00	3.25
Beams, etc., New York..	3.195	3.195	3.195	3.419
Skelp, grooved steel, P'gh.	2.90	2.90	2.90	3.50
Skelp, sheared steel, P'gh.	3.25	3.25	3.25	3.75
Steel hoops, Pittsburgh..	3.50	3.50	3.50	3.75

\*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire,	Mar. 6 1918	Feb. 27 1918	Feb. 6 1918	Mar. 7 1917
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	5.00	5.00	5.00	4.75
Sheets, galv., No. 28, P'gh	6.25	6.25	6.25	6.75
Wire nails, Pittsburgh...	3.50	3.50	3.50	3.20
Cut nails, Pittsburgh...	4.00	4.00	4.00	3.70
Fence wire base, P'gh....	3.25	3.25	3.25	3.15
Barb wire, galv., P'gh..	4.35	4.35	4.35	4.05*

### Old Material: Per Gross Ton:

Carwheels, Chicago .....	\$30.00	\$30.00	\$30.00	\$20.00
Carwheels, Philadelphia..	30.00	30.00	30.00	20.50
Heavy steel scrap, P'gh..	30.00	30.00	30.00	22.00
Heavy steel scrap, Phila.	30.00	30.00	30.00	22.00
Heavy steel scrap, Chi'go.	29.50	29.50	30.00	22.75
No. 1 cast, Pittsburgh...	30.00	30.00	30.00	20.00
No. 1 cast, Philadelphia..	30.00	30.00	30.00	20.00
No. 1 cast, Chicago (net ton) .....	26.75	26.75	26.00	16.50
No. 1 R.R. wrot, Phila...	35.00	35.00	35.00	29.00
No. 1 R.R. wrot, Chicago (net) .....	30.75	31.25	31.25	25.00

### Coke, Connellsville, Per Net Ton at Oven:

Furnace coke, prompt...	\$6.00	\$6.00	\$6.00	\$10.00
Furnace coke, future....	6.00	6.00	6.00	7.00
Foundry coke, prompt...	7.00	7.00	7.00	12.00
Foundry coke, future....	7.00	7.00	7.00	7.50

### Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York..	23.50	23.50	23.50	36.25
Electrolytic copper, N. Y.	23.50	23.50	23.50	36.25
Spelter, St. Louis.....	7.625	7.75	7.75	10.82 1/2
Spelter, New York.....	7.875	8.00	8.00	10.87 1/2
Lead, St. Louis .....	7.10	7.10	6.85	9.50
Lead, New York .....	7.25	7.25	7.00	9.50
Tin, New York .....	85.00	85.00	85.00	54.00
Antimony (Asiatic) N. Y.	13.50	13.50	14.00	30.00
Tin plate, 100-lb. box, P'gh	\$7.75	\$7.75	\$7.75	\$8.00

Producers meanwhile are not anxious to sell until more is known regarding price fixing. The railroad situation in the Pittsburgh, Youngstown and other districts is steadily getting better, but is still far from normal. A good deal of material in mill warehouses is now moving out to consumers, but several months will be required for a full clearing. Reports are current of heavy purchases of locomotives, cars and other materials to be made by the Government, but nothing definite can yet be learned. Should the present favorable weather last through March, it is fully expected that the output of pig iron, semi-finished and steel products this month will be heaviest in any one month since last summer. There has already been a notable increase in output in sheets, tin plate, pipe and other finished steel products.

**Pig Iron.**—New sales are largely confined to foundry and malleable Bessemer, there being substantially a famine in the supply of Bessemer and basic iron. It is true that some large quantities of Bessemer and basic have been sold for delivery in the second half of the year, one local steel company having bought in the past month 30,000 to 40,000 tons of both Bessemer and basic, the price to be fixed later. The Westinghouse Electric & Mfg. Co. has bought upward of 15,000 tons of foundry and malleable Bessemer iron, largely for delivery to its Cleveland works in last half of this year, the price being open, and to be whatever Government price is in effect at the time shipments of the iron are made. The output of pig iron is steadily increasing, furnaces banked for lack of coke getting started, and the output of pig iron in March is likely to show a large increase over the preceding three or four months. The Carnegie Steel Co. is now operating 36 to 37 furnaces out of 59; the National Tube Co. has 9 out of 11 going, and the Jones & Laughlin Steel Co. 10 out of 11.

The supply of coke is better and some furnaces also report that its quality is improving. All the blast furnaces are much behind in deliveries, and consumers are in some cases trying to pick up small lots to help out until shipments are made.

We quote as follows: Basic pig iron, \$33; Bessemer, \$36.30; gray forge, \$32; No. 2 foundry, \$33; No. 3 foundry, \$32.50, and malleable Bessemer, \$33.50, all per gross ton at Valley furnace, the freight rate for delivery in the Cleveland and Pittsburgh districts being 95c. per ton.

**Billets and Sheet Bars.**—Reference was made in this report last week to the fact that some open hearth ingots were available from a plant that has its furnaces going, but has not yet completed its finishing mills. It is said this particular concern has sold a considerable quantity of such ingots to an interest in the Youngstown district for use in sheet mills, allowing it to divert more of its own open hearth product to shell steel. There is a great scarcity of sheet bars, with very active inquiry. Shutdowns of sheet and tin plate mills for two or three days are frequent, waiting for steel to arrive. The trade here does not believe there will be any revision in prices in billets and sheet bars on March 31 and hopes that present prices will be reaffirmed for the entire year. There is fairly active demand for forging billets and some small sales are being made for fairly prompt delivery at Government prices.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at \$47.50, sheet bars \$51, forging ingots \$73, and forging billets \$60 base, all f.o.b. at mill, Pittsburgh or Youngstown.

**Steel Rails.**—There is an active demand for light rails from the coal mining and lumber interests, but very little new developments in the extension of or in the building of traction lines. Mills rolling light rails are sold up for months ahead, and with the restriction in output during December, January and February they get still further behind in deliveries on contracts.



The Carnegie Steel Co. is out of it as a seller of light rails or standard sections for all of this year, and has obligations on its books on standard sections for 1919 delivery. The Government price on light rails, rolled from billets, is \$3 per 100 lb. for 25 to 45-lb. sections.

**Ferroalloys.**—There is a fair amount of new buying of 80 per cent domestic ferromanganese for delivery in last half of this year, and it is said all the sales are being made at the fall price of \$250 per gross ton, delivered. There is also a fairly active demand for 50 per cent ferrosilicon, which is quoted for second quarter delivery at \$170 to \$175 at furnace. There is also an active demand for spiegeleisen, one Canadian consumer having an inquiry in the market for 3000 tons for delivery over the remainder of this year. The Whitaker Glessner Co., Wheeling, W. Va., and the Inland Steel Co., Chicago, are credited with having bought considerable quantities of spiegeleisen at the price of about \$3 per unit. Spiegeleisen is getting scarcer and prices are firm and somewhat higher. We quote 80 per cent domestic ferromanganese at \$250, delivered, 50 per cent ferrosilicon at \$165 to \$170 at furnace and 18 to 22 per cent spiegeleisen at \$65 to \$70, delivered. It is said some makers are asking higher prices.

We now quote 9 per cent Bessemer ferrosilicon at \$54, 10 per cent \$55, 11 per cent \$58.30, 12 per cent \$61.60. We quote 6 per cent silvery iron \$40, 7 per cent \$42, 8 per cent \$44.50, 9 per cent \$47, 10 per cent \$50. Three dollars per gross ton advance for each 1 per cent silicon for 11 per cent and over. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, these furnaces having a uniform freight rate of \$2 per gross ton, for delivery in the Pittsburgh district.

**Structural Material.**—It is stated the American Bridge Co. has recently taken Government and other contracts for 50,000 to 60,000 tons of structural material and also about 6000 tons for new buildings for the Ford Motor Co. at Detroit. New inquiry is slightly more active. Bids are being taken on 2500 tons for warehouses for the quartermaster department, and about 4500 tons for a new steel car plant at Greenville. A local interest has taken 1100 tons for a Government explosives plant in West Virginia. We quote beams and channels up to 15 in. at 3c., at mill Pittsburgh.

**Plates.**—The new inquiry from the general trade is fairly active, but it is probable the Government is taking close to 75 per cent of all the plates being made in the Pittsburgh and nearby districts for its ship-building program. One Youngstown interest has been giving its entire output to the Government for some time. Some mills regard the price of 3.25c. as too low, but it is not believed prices will be revised to a higher basis on March 31. Current reports are that the Government will soon send out inquiries for 100,000 to 150,000 steel cars, and if these orders should develop the cars will be built for prompt delivery and will mean further pressure on the mills for plates. We quote ¼-in. and heavier sheared plates at 3.25c., Pittsburgh mill.

**Sheets.**—There has been a material increase in the rate of operations among the sheet mills in the past two weeks. About Feb. 15, output was down to about a 40 per cent basis, but it is now said the average rate is close to 60 per cent. The Government placed lately about 50,000 tons of corrugated and flat sheets, the quantity of corrugated sheets being about 24,000 tons and of No. 22 gage. The orders have been distributed among the sheet mills, a good part having been taken by the leading interest. All the sheet mills are very much back in deliveries; some mills that figured some time ago as being sold up to July 1, now say their obligations will take their output probably to Sept. 1. Sheet makers do not believe the Government will make any change in price on March 31. Prices of sheets are given in detail on page 651.

**Tin Plate.**—All the manufacturers are speeding up output and it is said are now running to full 90 per cent of normal. Further preference has been given by the railroads to shipments of tin plate, and the manufacturers believe they will soon have almost a full supply of cars to move the large stocks in mill warehouses. The shortage in steel is holding down output to some extent, and it is figured that during the cold weather and the railroad congestion, the tin plate mills

probably lost a full month's output. The demand for stock items of tin plate is very active, and these are being shipped out as fast as cars can be secured. We quote tin plate at \$7.75 per base box, rolled from Bessemer or open hearth stock. Prices onterne plate are given on page 651.

**Iron and Steel Bars.**—New demand for both iron and steel bars is only fair, but recently some fairly large contracts for steel bars were placed by the Government, and also by implement makers, the latter for second quarter delivery. Makers are not disposed to sell very heavily for second or third quarter delivery until they know whether prices are to be revised on March 31. We quote steel bars, rolled from old steel rails at 3c.; from steel billets, 2.90c.; and refined iron bars at 3.50c. f.o.b., Pittsburgh.

**Wire Rods.**—Makers have fairly heavy inquiries, but as a rule are not quoting, stating they have all the orders they can take care of over the next two or three months, and do not care to sell beyond that period. Export inquiry is heavy, and there is also a good deal of inquiry from the general trade for wire carbon rods. Fairly large shipments of rods on contracts are being made to Canada. There are several lots of rods in warehouses in Eastern points, originally intended for export, but for which bottoms have not been obtained, and the mills that sold these rods have been asked to find a market for them in this country. Prices on rods are given in detail on page 651.

**Wire Products.**—At the general meeting of steel manufacturers held in New York on March 1 the wire trade was represented. It seemed to be the sense of the wire manufacturers that if present prices on wire products are reaffirmed from March 31, say for the remainder of the year, it would be satisfactory to them, and to consumers as well. Based on high cost of labor and steel, the margin in profit on nails and wire is only fair, and while two or three manufacturers insist that an advance should be made, this is not regarded as likely. However, should a reduction in pig-iron prices be made, it might be followed by a lower market on wire products, but this is not counted on. New demand is fair, and specifications against contracts for wire are more active than for wire nails. Export inquiries for nails and wire are fairly active, but all quotations made by the mills on nails and wire for export are contingent upon the buyers being able to get Government licenses. Local mills say they are sold up on nails and wire over the next three months or longer. Prices on wire products in effect until March 31 are given on page 651.

**Nuts and Bolts.**—The Government is placing a fair amount of new business. Probably 75 per cent of the present limited output of nuts and bolts is for the Government on direct and indirect orders. The new demand from the railroads in the past two weeks is better, some fairly large orders having come from this source. The car supply is better, and the heavy stocks piled in warehouses are now moving out quite freely. Makers of nuts and bolts do not look for any change in prices on March 31, and say that prices could not very well be reduced unless prices on steel are lowered. Official discounts in effect until March 31 are given on page 651.

**Rivets.**—The new demand from the general trade is light, but the Government is placing some fairly heavy orders, one such contract lately being for about 20,000 kegs, divided among Pittsburgh and Cleveland makers. Output of rivets is large, and is said to be running about 60 per cent or more of normal. The car supply is better, and heavy stocks of rivets piled up are moving out. We quote structural rivets at \$3.65 and cone-head boiler rivets at \$3.75 per 100 lb., f.o.b. Pittsburgh.

**Hoops and Bands.**—Demand from the general trade and from the Government has fallen off. However, during the railroad congestion the mills got further behind in deliveries and have their output pretty well sold up over the next three months or longer. The shortage in steel is keeping down output very considerably. We quote steel hoops at 3.50c. and steel bands



at 2.90c. Extras on the latter as per the steel bar card, f.o.b. Pittsburgh.

**Hot Rolled Strip Steel.**—Makers report only fair demand, and are not operating their plants to more than about 60 per cent of capacity. The Government price on hot rolled strip steel is \$4.50 per 100 lb., f.o.b. Pittsburgh. The price is not very firmly held.

**Cold-Rolled Strip Steel.**—Mills are not disposed to make contracts and consumers are not anxious to buy very far ahead. The Government is placing fairly large orders, which the mills are shipping as promptly as they can. The average rate of operation among cold-rolled strip mills is not more than 60 per cent. Makers do not look for any change in prices on March 31.

We quote cold-rolled strip steel at \$6.50 per 100 lb., f.o.b. Pittsburgh, terms 30 days, less 2 per cent cash in 10 days, when sold in quantities of 300 lb. or more.

**Shafting.**—Most of the new business is coming from the Government on direct or indirect orders. The makers lost output during the cold weather and railroad congestion, and are much behind in deliveries. They do not look for any change in prices on March 31. The shortage in steel is keeping down output very materially. We quote cold rolled shafting at 17 per cent off list in carload and 12 per cent in less than carloads, f.o.b. Pittsburgh.

**Spikes.**—Recently the New York, New Haven & Hartford placed 7000 kegs and the B. & O. 5000 kegs of railroad spikes with local makers for prompt delivery. New demand for small spikes is heavy, and makers have their output sold up for some months ahead. It is said that some jobbers are charging the small trade \$5.90 for small lots of spikes, which is unfair, as the Government fixed the price of railroad spikes in lots of less than 200 kegs at \$1 per hundred pounds extra, so that small consumers can buy from the mills direct at this advance, and there is no need to pay higher prices to jobbers. We quote:

Standard sizes of railroad spikes, 9/16 x 4 1/2 in. and larger, \$3.90 per 100 lb. in lots of 200 kegs of 200 lb. each, or in larger lots. Boat spikes, \$5.25 per 100 lb.; track bolts, \$4.90 base in lots of 200 kegs or more; less than 200 keg lots, \$1 per 100 lb. extra. All f.o.b. Pittsburgh.

**Skelp.**—Demand for boiler tube and pipe skelp is very heavy, and mills are sold up for some months ahead. We quote grooved skelp at \$2.90; universal skelp, \$3.15, and sheared skelp, \$3.25 base. Special skelp for boiler tubes, etc., is \$3.40 for base sizes and \$3.55 for other sizes, all prices being per 100 lb., f.o.b. Pittsburgh.

**Wrought Pipe.**—The mills report an insistent demand for oil country goods, very much beyond their capacity to supply as promptly as wanted. Operations among the pipe mills are on a larger basis now than for some time, one leading interest expecting in March to turn out close to 90 per cent of its capacity. The current demand for iron and steel pipe is not very active, and new orders from the Government have been slow for some time. Most of the mills rolling iron and steel pipe are sold up for the remainder of this year. Discounts on iron and steel pipe are given on page 651.

**Boiler Tubes.**—The Government is taking enormous quantities of iron and steel tubes, and also of seamless steel tubing, which the mills are turning out as promptly as possible. The leading maker of steel welded and seamless tubes is shipping nearly its entire output on direct and indirect Government orders. Some makers of iron and steel tubes, and also of seamless steel tubing, have large orders on their books for early delivery next year. Discounts on iron and steel tubes are given on page 651.

**Coke.**—Operating and shipping conditions in the coke regions are steadily getting better, but it will be some time yet before they are back to normal. It is said the supply of cars last week averaged close to 75 per cent. It is also stated that the quality of coke is showing some improvement, and this is certainly very badly needed. In the Youngstown district 22 out of 26 blast furnaces are now active, and this shows fully the improvement that has come in shipments of coke. Output in coke in the Upper and Lower Connellsville regions last week was about 260,000 tons, an increase over

the previous week of nearly 20,000 tons. We quote 48-hr. blast furnace coke at \$6, 72-hr. foundry coke at \$7, and crushed coke from 1-in. size at \$7.30 per net ton at oven.

**Old Material.**—Local dealers report there is practically no betterment in conditions in the scrap trade, there still being great difficulty in getting cars. The available supply of scrap is very low, and stocks held by the larger consumers have about been used up. With the poor shipments that are being made, some concerns are likely to have difficulty in operating their open hearth plants. It is claimed a mistake was made in not fixing prices of scrap f.o.b. at shipping point, as this would have allowed scrap to be brought into the Pittsburgh district from other places, but which under the present restrictions is impossible.

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered.....	\$30.00
No. 1 foundry cast.....	\$30.00
Rebbling rails, Newark and Cambridge, Ohio, Cumberland, Md., Franklin, Pa., and Pittsburgh.....	35.00
Hydraulic compressed sheet scrap.....	\$26.00 to 27.00
Bundled sheet scrap, sides and ends f.o.b. consumers' mill, Pittsburgh district.....	24.00 to 25.00
Bundled sheet stamping scrap.....	22.00 to 23.00
No. 1 railroad malleable stock.....	30.00
Railroad grate bars.....	19.00 to 20.00
Low phosphorus melting stock.....	40.00
Iron car axles.....	47.50
Steel car axles.....	47.50
Locomotive axles, steel.....	47.50
No. 1 busheling scrap.....	27.00 to 28.00
Machine shop turnings.....	20.00
Cast iron wheels.....	30.00
Roller steel wheels.....	35.00 to 37.00
*Sheet bar crop ends.....	39.00 to 40.00
Cast iron borings.....	20.00
No. 1 railroad wrought scrap.....	35.00
Heavy steel axle turnings.....	25.00 to 26.00
Heavy breakable cast scrap.....	30.00

\*Shipping point.

The Pittsburgh office of the Reliance Iron & Coke Co. has been moved to 1226 Park Building, in that city. Ray S. Fox is manager.

## Chicago

CHICAGO, March 5—(By Wire).

Mill operations are close to normal and the general feeling is decidedly better, although manufacturers are greatly troubled over the inadequate supply of cars procurable for the shipment of their product. The leading wire interest needs at least 1000 cars to ship goods already manufactured. At Gary, 10 furnaces are in blast, with another soon to be blown in; at South Works, the Illinois Steel Co. has nine furnaces operating, with another to go in soon, and at Joliet, the same company has three stacks in blast. The rolling mill operations of the company are in proportion. The leading independent is on an 85 to 90 per cent basis. The trade at large is hopeful that present prices will be continued after April 1, and would regard with special satisfaction the extension of present levels through the remainder of year. Consumers, as well as producers, are anxious to contract ahead at known prices. Their ability to do this would stabilize not only the iron and steel market, but the quotations on countless manufactured products could be fixed for a reasonable distance ahead. The booking of much second quarter material is being held back until the situation clears, although in pig iron there is an exception, consumers being eager to buy and agreeing to price revision should it be ordered. So much iron has been sold for the last half that deliveries will be the chief concern of makers and their representatives. The Government is contemplating the placing from Jeffersonville of orders for 55,000,000 bolts.

**Pig Iron.**—The chief feature lies in the fact that sellers can readily dispose of all the iron they can find to sell but they have but little to offer for any delivery. So far as the last half is concerned it can already be said that the producers and sellers will be chiefly occupied in effecting deliveries. A large Southern interest has between 15,000 and 20,000 tons of unsatisfied inquiry awaiting attention for the last half. It has only low silicon iron to offer and its business for the first half is confined to small quantities of very high silicon and gray forge iron. Other interests have sold

limited quantities on prompt shipment of silvery, but the market in general has been dull in the absence of material to sell. Meanwhile inquiry is big, the demand for malleable continuing especially conspicuous. Steel works furnaces in this locality are now running at a normal rate. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic irons, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, Nos. 2 to 5.....	\$37.50
Lake Superior charcoal, No. 6 and Scotch....	40.00
Northern coke foundry, No. 1.....	33.50
Northern coke foundry, No. 2.....	33.00
Northern coke foundry, No. 3.....	32.50
Northern high-phosphorus foundry.....	33.00
Southern coke No. 1 foundry and No. 1 soft..	38.50
Southern coke No. 2 foundry.....	37.00
Malleable Bessemer.....	33.50
Basic.....	33.00
Low phosphorus (copper free).....	53.00
Silvery, 7 per cent.....	44.54

**Ferroalloys.**—The quotation for 80 per cent ferromanganese is strong at \$250 delivered.

**Plates.**—Neither large nor small mills are offering plates to miscellaneous consumers. The only business reported is the acceptance of a few orders by a local mill for plates required for tank cars and oil storage tanks, the need of these being urgent. Government requirements, direct or indirect, absorb the entire capacity of the mills. The mill quotation is 3.25c., Chicago, and that of jobbers for plates out of warehouse is 4.45c.

**Bars.**—Agricultural implement makers have been accommodated where they sought to satisfy urgent needs, steel makers considering implement requirements as ranking next to munitions in importance. An Eastern maker has taken several small orders placed by jobbers and small consumers. The quantities available are limited as to sizes. Mild steel bars are quoted at 2.90c., Chicago, rail carbon at 3c., Chicago, and common bar iron at 3.50c. Chicago warehouse prices follow:

Soft steel bars, 4.10c.; bar iron, 4.10c.; reinforcing bars, 4.10c., base, with 5c. extra for twisting sizes  $\frac{1}{2}$  in. and over and usual card extras for smaller sizes; shafting, list plus 10 per cent.

**Structural Material.**—Fabricating parts for ships continues the principal work of the Western structural shops. Improvements made by the Utah Copper Co. and the Calumet & Hecla Mining Co. have contributed in no small degree to current work. No new cars are reported. The Worden Allen Co. will fabricate a head-frame requiring 100 tons for the Colby Iron Mining Co. at Bessemer, Mich. The Minneapolis Steel & Machinery Co. has the contract for the Steffens plant of the Utah-Idaho Sugar Co., requiring 150 tons, at Toppenish, Wash. An unknown bidder obtained the award of 160 tons required in conveyor supports, etc., by the primary and secondary crushing plant of the Utah Copper Co., Arthur, Utah. The mill quotation is 3c. and that for material out of warehouse 4.20c.

**Rail and Track Supplies.**—There are indications that important buying of rails and track materials will be handled by the director general of the railroads, the roads having in some cases referred the mills to that official. In one case an inquiry for 3000 tons of rails was withdrawn with the understanding that on revival it would come from the Government. We quote:

Standard railroad spikes, 4.11 $\frac{1}{2}$ c., Chicago. Track bolts, with square nuts, 5.11 $\frac{1}{2}$ c., Chicago. Tie plates, 3.25c., f.o.b. maker's mill. The base for light rails is 3c., f.o.b. maker's mill for 25 to 45-lb. sections, lighter sections taking Government extras.

**Wire Products.**—The makers see more raw material in sight, but are still greatly troubled by a lack of cars in which to move their finished product. The largest interest needs at least 1000 cars to deliver material fabricated and in stock. We quote Government levels as follows:

Nails, \$3.50, Pittsburgh; plain fence wire, \$3.25; painted barb wire, \$3.65; galvanized barb wire, \$4.35; polished staples, \$3.65, and galvanized staples, \$4.35.

**Sheets.**—Despite the ban recently placed on exports through the medium of requiring export licenses, the domestic situation is not relieved. The producer adheres to a course of not selling while future prices are

a matter of uncertainty. A Middle Western mill requires that all inquiries be submitted and then usually declines to accept the business. With this mill the great demand for steel from other directions has created a shortage of sheet bars and its output is therefore but 50 per cent of capacity. We quote No. 10 blue annealed at 4.25c.; No. 28 black at 5c. and No. 28 galvanized at 6.25c., all Pittsburgh.

We quote for Chicago delivery out of stock, regardless of quantity, as follows: No. 10 blue annealed, 5.45c.; No. 28 black, 6.45c., and No. 28 galvanized, 7.70c.

**Bolts and Nuts.**—The Eastern embargoes are easing up. Raw material is more plentiful and orders are more numerous, all of which makes the general situation brighter. It is noticeable, however, that the orders are smaller than is ordinarily the case. The Government contemplates the placing of orders for 55,000,000 bolts at Jeffersonville. For prices and freight rates see finished iron and steel, f.o.b. Pittsburgh. Jobbers quote as follows:

Structural rivets, 5.50c.; boiler rivets, 5.60c.; machine bolts up to  $\frac{3}{4}$  x 4 in., 40 and 10 per cent off; larger sizes, 35 and 5 off; carriage bolts up to  $\frac{3}{4}$  x 6 in., 40 and 2 $\frac{1}{2}$  off; larger sizes, 30 and 5 off; hot pressed nuts, square tapped, \$1.05 off, and hexagon tapped, 85c. off per 100 lb.; coach or lag screws, gimlet points, square heads, 50 per cent off.

**Cast Iron Pipe.**—St. Paul, Minn., placed 438 tons with the Hammond-Bird Iron Co. Minneapolis placed 1396 tons with the American Cast Iron Pipe Co., and on March 7 will take bids on 350 tons additional. Rockford, Ill., gave 485 tons of pipe and specialties to the United States Cast Iron Pipe & Foundry Co. It is noticed that while current propositions usually involve small tonnages, the aggregate of business done is better than was expected.

Quotations per net ton, Chicago, are as follows: Water pipe, 4-in., \$57.30; 6-in. and larger, \$54.30, with \$1 extra for Class A water pipe and gas pipe.

**Old Material.**—About the only betterment in activity is confined to cast scrap, which many melters have been eager to get since the official allowable maximum price was raised. Steel is quiet. Embargoes in various directions are cutting down shipments fully 50 per cent with some brokers, but they look for a betterment and believe a good movement to be near. The Great Northern has issued the largest list which has appeared in some time. Miscellaneous grades, aggregating about 8000 tons, are listed, a departure being that the material is offered in carloads instead of in tons. The question of putting all quotations, or practically all, in gross tons, is mooted in view of official quotations being on that basis. At the same time it is conceded that a great deal of business is done upon the net ton basis, in some items invariably, and that net tons greatly facilitate figuring. We quote for delivery in buyers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

#### Per Gross Ton

Old iron rails.....	\$38.00 to \$39.00
Relaying rails.....	60.00
Old carwheels.....	30.00
Old steel rails, rerolling.....	35.00
Old steel rails, less than 3 ft.....	35.00
Heavy melting steel.....	29.50 to 30.00
Frogs, switches and guards, cut apart.....	29.50 to 30.00
Shoveling steel.....	29.00 to 29.50
Steel axle turnings.....	25.00

#### Per Net Ton

Iron angles and splice bars.....	\$35.71
Iron arch bars and transoms.....	\$39.00 to 40.00
Steel angle bars.....	30.50 to 31.00
Iron car axles.....	42.41
Steel car axles.....	42.41
No. 1 railroad wrought.....	30.75 to 31.25
No. 2 railroad wrought.....	30.36
Cut forge.....	30.36
Pipes and flues.....	24.00 to 24.50
No. 1 busheling.....	26.00 to 26.50
No. 2 busheling.....	18.25 to 18.75
Steel knuckles and couplers.....	31.25
Coil springs.....	31.25
No. 1 boilers, cut to sheets and rings.....	22.00 to 23.00
Boiler punchings.....	32.00 to 33.00
Locomotive tires, smooth.....	37.50 to 38.50
Machine-shop turnings.....	16.50 to 17.00
Cast borings.....	16.25 to 16.75
No. 1 cast scrap.....	26.75 to 27.75
Stove plate and light cast scrap.....	22.50 to 23.00
Grate bars.....	22.00 to 23.00
Brake shoes.....	24.00 to 25.00
Railroad malleable.....	26.79
Agricultural malleable.....	26.25 to 26.75
Country mixed scrap.....	20.00 to 22.50



## Philadelphia

PHILADELPHIA, March 5.

Eastern Pennsylvania steel plants and blast furnaces are making slow recovery from the conditions which have curtailed production for the past two or three months and 60 per cent of capacity represents the maximum of present production, with some plants not exceeding a 50 per cent output. Coal and coke shortage continues to be the controlling factor in the situation. There is a gradual improvement in the railroad congestion, but confusion results from the various embargo orders in effect. Local freight agents do not seem to keep fully posted on the shipping instructions of the general freight offices and this is causing shippers and consignees no end of trouble, the expense of telegrams, adding to the cost of doing business. A few of the blast furnaces which had been banked have resumed partial operations. Steel plants in this district are all in operation, except the Wilmington Steel Co.'s plant, Wilmington, Del., but the rolling mills are not supplied with a sufficient tonnage of ingots because of shortage of gas coal for open-hearth furnaces. To-day the Alan Wood Iron & Steel Co. had 7 of its 12 furnaces and the Lukens Steel Co. 7 of its 19 furnaces in operation. Repeated complaints to Washington regarding coal shortage seem of little avail in improving the situation. Much of the blame for existing conditions is heaped upon the Fuel Administration. Interest of steel and pig iron men centers in the fixed prices to be in effect after March 31. Reports of the meeting of representatives of the industry in New York last Friday indicate that the War Industries Board will be asked to reaffirm the present schedules, though some of the producers of plates and shapes want higher prices. Makers of bar iron also are not satisfied with the 3.50c. price now in effect. An eastern Pennsylvania maker of billets has shown officials in Washington that its costs in January exceeded the Government price of \$47.50, Pittsburgh. Effort is being made in certain iron on the contention that pig iron can be produced more cheaply in the South than in the North and East. quarters to reduce the prices at furnace for Southern

**Pig Iron.**—Furnace representatives here believe that the fixed price of \$33, base, f. o. b. furnace, will be reaffirmed by the Government, so far as it applies to Eastern and Northern furnaces. It is known, however, that certain large consumers of iron in the North have made representations to the authorities in Washington that the price for Southern iron should be reduced, their contention being that it costs much less to produce iron in the South. Sellers of iron are conservative in their future commitments, but the price situation is not so much a factor in this attitude as the conditions which make it impossible to foretell what furnace output is likely to be over the remainder of the year. The principal sale of the week was 25,000 tons of Southern basic iron for second half delivery to an East St. Louis company by a Philadelphia sales office. Inquiries for basic iron for second half now pending are from the Worth Steel Co., which is building a plate mill at Claymont, Del.; the Phoenix Iron Co., Phoenixville, Pa., and the Penn Seaboard Steel Castings Co., Philadelphia. Stanley G. Flagg & Co., Pottstown, have issued an inquiry for 6000 tons of malleable Bessemer, 1500 tons of basic analyzing 1.15 to 1.50 per cent silicon and 600 tons of foundry iron of 3.00 to 3.25 per cent silicon, all for last half. Sales of foundry iron for second half in February were considerable, due to the anxiety of foundrymen to cover their requirements as far ahead as possible. Sales of misfit iron are being made by a number of nearby furnaces for prompt delivery, such iron fetching \$32 at furnace. One of the Warwick furnaces at Pottstown, Pa., started up this week on low phosphorus iron, having been banked for two months or more. A quantity of ore has been supplied by the Eastern Steel Co. and about 15,000 tons will be brought from Cuba. The total production of 15,000 to 20,000 tons of low phosphorus iron will be for Government use, 13,000 tons having already been ordered shipped to the Tacony Ordnance Corporation, Tacony, Pa., and the Edgewater Steel Co., Pittsburgh, which will make heavy gun forgings. The

remainder will probably be ordered shipped to a steel company for making other gun forgings. We quote standard grades of iron f. o. b. furnace, except Virginia iron, for which the delivered prices are quoted:

Eastern Pennsylvania No. 1 X.....	\$34.50
Eastern Pennsylvania No. 2 X.....	33.50
Eastern Pennsylvania No. 2 foundry.....	33.00
Virginia No. 2 X (including freight).....	36.77
Virginia No. 2 foundry (including freight).....	36.27
Basic .....	33.00
Gray forge .....	32.00
Bessemer .....	36.30
Standard low phosphorus.....	53.00
Low phosphorus (copper bearing).....	50.00

**Coke.**—Commandeering of coke by the Government for the Warwick furnace at Pottstown, Pa., and for the Midvale Steel & Ordnance Co. has reduced supplies at other blast furnaces. The coke situation shows little improvement. The quality of the coke is such that many furnaces are not able to make sufficient standard iron for shipment on current schedules.

**Ferroalloys.**—Ferromanganese is firm at \$250 for the 80 per cent. Inquiry is fair. Spiegeleisen is firmer and a carload for spot delivery brought \$65 last week. Sales are still being made, however, at \$60.

**Billets.**—A recent sale of 1000 tons of billets was made by a Pennsylvania steel company to an old customer. Production of ingots has been so low that producers are finding great difficulty in fulfilling their contract orders. Cost sheets for January on billets made at a nearby mill have been shown to the War Industries Board. Owing to the difficulties in operating during that month the company's cost of making billets exceeded the Government price of \$47.50, Pittsburgh. We quote 4 x 4-in. open hearth rerolling billets at \$50.50, Philadelphia.

**Sheets.**—A small amount of business is being done, mostly in limited tonnages of desirable sizes. We quote No. 10 blue annealed sheets at 4.25c., No. 28 black at 5c. and No. 28 galvanized at 6.25c., Pittsburgh.

**Plates.**—The Lukens Steel Co., the Nagle Steel Co. and the Glasgow Iron Co., makers of plates, are reported to have asked the Committee on Steel and Steel Products of the American Iron and Steel Institute and the War Industries Board for higher selling prices on plates, effective April 1. The Lukens Steel Co. reported its present cost of producing ingots to be \$49 per ton, and it contends that it cannot sell plates at the 3.25c. price without losing money. The Nagle and Glasgow mills are buyers of slabs for rerolling, and their request for a higher price is based on the contention that the differential between the fixed price on slabs and the fixed price on plates is not sufficient to cover their conversion costs and leave a profit. It is intimated that some action may be suggested to the War Industries Board that will permit an extra to be charged by these non-integrated companies so that the country will not lose their plate production, at the same time permitting them to operate at a profit. Government demand for plates continues active. Orders for plates and shapes for ships and construction work received by the Midvale Steel & Ordnance Co. during the past week totalled about 25,000 tons. This company was also awarded an order for 10,000 tons of ¼-in. plates, all of one size, by the British Mission. We quote plates, ¼-in. and heavier, at 3.25c., base, Pittsburgh.

**Shapes.**—Some of the smaller producers of structural shapes have made a request for a higher price, effective April 1, but there is nothing to indicate as yet what action may be taken. New demand for structural steel shows some improvement, but a majority of the jobs up for bids average about 50 tons. The Edge Moor Iron Co., Edge Moor, N. J., wants 200 tons for an addition. Action is still pending on the 3050 portable hangars which the Government may buy for shipment to France.

**Iron and Steel Bars.**—Makers of bar iron have asked for a higher price, effective April 1. Production of bar iron has been at not more than 50 per cent of capacity during the past two or three months. The mills have lost a large volume of South American trade through the recent Government order on export shipments. Steel bar makers are not taking on new orders



of any size. There are several export inquiries in the market for concrete reinforcing bars. We quote soft steel bars at 2.90c., Pittsburgh, and bar iron at 3.685c., Philadelphia.

**Old Material.**—Movement of scrap over the railroads is in larger volume. There is some letting up in the restrictions on shipment of mixed cars to scrap yards. Small dealers seem somewhat more anxious to sell. There is a slight weakness in heavy melting steel, though it is not reflected in any change of price, \$30, delivered, still being obtainable at eastern Pennsylvania steel plants, though none will pay the 3½ per cent commission. The question as to whether dealers should be permitted to charge the commission on shipments of scrap from their yards has not yet been settled. Another meeting of the Committee on Steel and Steel Products of the American Iron and Steel Institute will be held the latter part of this week in New York and final action will probably then be taken. The monthly list of the Pennsylvania Railroad is smaller than usual, but is causing dealers and brokers infinitely more trouble because of the new regulations for submitting bids. All bids must be f.o.b. consuming point and must state the amount of scrap for which bid is submitted, the price f.o.b. the railroad company's shop, the freight rate to consuming point and thus the total cost at consuming point. The name of the consignee must also be given and the bidder must state whether the steel is to be used in a basic or acid open hearth furnace or, in the case of borings and turnings, whether they are to be used in a chemical plant or gas house. The railroad company is acting under instructions of the Sub-Committee on Iron and Steel Scrap and is, of course, actuated by a desire to keep selling prices within the maximum prices permitted by the Government. There is a good demand for No. 1 cast, railroad malleable and wrought scrap. We quote the following prices for delivery at consuming points in the eastern Pennsylvania district:

No. 1 heavy melting steel.....	\$30.00
Steel rails, rerolling.....	35.00
Low phosphorus heavy, 0.04 and under.....	\$37.50 to 40.00
Low phosphorus (not guaranteed).....	35.00
Old iron rails.....	40.00
Old carwheels.....	30.00
No. 1 railroad wrought.....	35.00
No. 1 yard wrought.....	34.00
Country yard wrought.....	30.00
No. 1 forge fire.....	27.50 to 28.50
Bundled sheets.....	27.50 to 28.50
No. 1 busheling.....	32.00
No. 2 busheling.....	17.00 to 18.00
Turnings (for blast furnace use).....	17.50 to 18.00
Machine shop turnings (for rolling mill use).....	18.50 to 19.50
Cast borings (for blast furnace use).....	17.50 to 18.00
Cast borings (clean).....	20.00
No. 1 cast (for steel plant use).....	30.00
No. 1 cast (cupola sizes).....	35.00
Grate bars.....	23.00 to 24.00
Stove plate.....	23.00 to 24.00
Railroad malleable (for steel plants).....	29.00 to 30.50
*Railroad malleable (for malleable works).....	35.00
Wrought iron and soft steel pipes and tubes (new specifications).....	34.00
Ungraded pipe.....	30.00

\*Maximum price obtainable.

## Cleveland

CLEVELAND, March 5—(By Wire).

**Iron Ore.**—Ore shipments from Lake Erie docks during February were approximately 550,000 tons, leaving a dock balance of about 9,500,000 tons on March 1, or 1,000,000 tons more than a year ago. While shipments are now improving, the figures indicate that the dock space available at the opening of navigation will be less than during any previous year and the movement of ore during the season is likely to be delayed unless cars are available. There is not much activity in the market, as some consumers are in no hurry to purchase their ore. This is particularly true in the East, where, because of bad operating conditions, furnace operators do not know how much ore they will need. On this account reservations in the East so far have been light. Reservations of considerable tonnage will be converted into contracts this week. Prices lower Lake ports follow:

Old range Bessemer, \$5.95; old range non-Bessemer, \$5.20; Mesaba Bessemer, \$5.70; Mesaba non-Bessemer, \$5.05.

**Pig Iron.**—Consumers are finding it increasingly difficult to secure iron for the last half delivery. Many inquiries are coming in the market from other territories, but are being generally turned down, as some producers are not able to take care of the requirements of their regular trade. Another Cleveland selling agency is now out of the market, leaving only one interest here that has iron left for sale for delivery this year, but only in foundry and malleable grades. A northern Ohio steel company, which came in the market a few days ago for 72,000 tons of basic iron for the last half, has so far been unable to purchase any iron. The car wheel foundry that asked Government assistance in getting 17,000 tons of malleable iron for March-June delivery for car repair work has not secured the iron. It was advised to pick up such odd lots that it could in the Chicago district, where 15,000 tons of iron is wanted. The inquiry for 1,000 tons of Northern foundry iron from Italy is still pending, and efforts are being made to have the specifications changed so that Southern iron may be substituted. A consumer in the Buffalo territory making railroad equipment is inquiring for 12,000 to 18,000 tons of basic iron for the last half and 2000 tons for early shipment. An eastern Pennsylvania inquiry is for 6000 tons of malleable iron, 1500 tons of basic and 500 tons of foundry iron for the second quarter. There is a great deal of inquiry for silvery iron, but producers have not opened their books for the last half. The embargo on Southern iron at Cincinnati has been lifted, and this is now coming north in fairly good shape. We quote f.o.b. Cleveland:

Bessemer.....	\$37.25
Basic.....	33.30
Northern No. 2 foundry.....	33.30
Southern No. 2 foundry.....	37.00
Gray forge.....	32.30
Ohio silvery, 8 per cent silicon.....	46.12
Standard low phosphorus, Valley furnace.....	50.00

**Finished Iron and Steel.**—There is a good volume of miscellaneous inquiry for small lots of steel, largely for Government work. The implement manufacturers are pressing the mills to take on additional tonnage. The demand for plates is heavy. The 10,000 tons required by the Toledo Shipbuilding Co. for freight boats will be supplied by the Carnegie Steel Co. Recent inquiries for several thousand tons from oil companies for field tanks and tank cars resulted in the placing of only a very small portion of the steel, as deliveries could not be secured within six months. New plate inquiries include one from a Seattle shipyard for 1000 tons and one from a Canadian car works for 1000 tons. Inquiries for billet and sheet bars continue heavy, but consumers not making Government steel are finding it very difficult to secure a supply. A northern Ohio plant which is planning to increase its capacity largely, is inquiring for 3000 tons of billets per month for a year. A Cleveland contractor is inquiring for 1000 tons of soft steel bars for reinforcing work in Kansas City. A Toledo manufacturer has placed 800 tons of steel for escort and farm wagons. Among new inquiries is one for 600 tons of spring steel for tractor springs. The demand for black and blue sheets is heavy, and considerable tonnage sold for the first quarter will not be shipped before next month. One leading Valley producer is booking second quarter sheet contracts with the provision that either the buyer or seller can cancel the contract within ten days after the announcement of any change that the Government may make in prices, should the change not be acceptable to either party.

We quote warehouse prices as follows: Steel bars, 4.03½c.; plates, 4.38½c.; structural material, 4.13½c.; No. 10 blue annealed sheets, 5.35c.; No. 28 black sheets, 6.35c.; No. 28 galvanized sheets, 7.60c.

**Bolts, Nuts and Rivets.**—Bolt and nut specifications are fairly good, but new business is only moderate. Some price shading is reported to have been done recently on both Government and commercial orders. The demand for rivets continues very heavy, both in specifications and in new contracts.

**Coke.**—Coke shipments are about as bad as they have been any time. Although the railroad situation has improved materially, the car shortage is still very bad and this has prevented shipments coming forward more freely. A number of Cleveland foundries including some that are depending upon the by-product coke are

badly in need of coke and some are trying to secure small lots for prompt shipment. One leading producer is now taking contracts for foundry coke for the last half and full year from its regular trade. These contracts specify that the price shall be that named by the Fuel Administrator.

**Old Material.**—Scrap is in good demand, particularly low phosphorus scrap and heavy melting steel, but little business will be placed until a decision is reached as to whether dealers will still be allowed a 3½ per cent commission. Some mills now in the market express their willingness to pay the commission, and sales were made during the week in which dealers charged a commission, but the general disposition is to await action by the Government. The shortage of heavy melting steel scrap is still acute, although relieved somewhat by better transportation conditions. Dealers claim that this shortage is largely due to the fact that a great deal of material formerly sold as heavy melting steel scrap is now being disposed of at higher prices as low phosphorus scrap, mills not being allowed to pay above the heavy melting steel price for this scrap for basic open hearth plants. Because of the Government classification and price regulation considerable scrap produced in Cleveland is being diverted from open hearth plants. As practically all cast scrap sold to foundries comes under the new \$35 Government price, this maximum price is an advance of \$5 a ton for this grade, but foundries refuse to pay this price. However, sales have not been made to establish new prices on this grade or on railroad malleable scrap. Around \$33 is being offered for railroad malleable. The price of busheling scrap still remains below the Government maximum. An Erie, Pa., consumer is inquiring for about 18,000 tons of low phosphorus scrap for delivery over a period of twelve months. We quote, f. o. b., Cleveland, as follows:

Per Gross Ton	
Steel rails .....	\$27.00 to \$28.00
Steel rails, rerolling .....	35.00
Steel rails, under 3 ft. ....	35.50
Iron rails .....	40.00
Iron car axles .....	47.50
Steel car axles .....	47.50
Heavy melting steel .....	30.00
Cast borings .....	20.00
Iron and steel turnings .....	20.00
No. 1 railroad wrought .....	35.00
Hydraulic compressed steel scrap ..	29.00 to 30.00
Cast iron carwheels, unbroken .....	30.00
Cast iron carwheels, broken .....	35.00
Agricultural malleable .....	24.00 to 25.00
Railroad malleable .....	35.00
Steel axle turnings .....	25.00
Light bundled sheet scrap .....	24.50 to 25.00
Cast iron scrap .....	30.00
Cast iron scrap, broken to cupola sizes ..	30.00
No. 1 busheling .....	30.00
Per Net Ton	
Railroad grate bars .....	\$20.00 to \$21.00
Stove plate .....	20.00 to 21.00

## Cincinnati

CINCINNATI, March 5—(By Wire).

**Pig Iron.**—The lifting of freight embargoes has had a very favorable effect and has eclipsed the situation considerably. Iron would move more freely, especially from the South, if cars could be obtained. Shipments from the Hanging Rock district are moving forward at a more satisfactory rate than for some time, and production there is also on the increase. However, it will require considerable effort on the part of furnace operators to increase production to any considerable extent. This is practically true in all producing districts where furnaces have had to bank intermittently on account of the weather and a short coke supply. Some iron from southern Ohio has been sold recently to customers who wish to extend their old contracts. Southern foundry iron has not been as much in demand lately and both inquiries and sales have fallen off. Sellers and buyers are apparently awaiting the new price schedule that is to take effect April 1. The largest sale reported was to a local consumer of 500 tons for strictly last half shipment. High silicon iron in the South is becoming scarcer, while in southern Ohio it is impossible to buy any silvery iron for nearby shipment, and

the furnaces in that district are understood to have very little to offer for delivery in the last half. No basic sales have been made to nearby smelters, but it is understood that one consumer has been quietly negotiating with Southern producers but as yet without result. Based on freight rates of \$2.90 from Birmingham and \$1.26 Ironton, we quote f.o.b. Cincinnati, as follows:

Southern coke, No. 2 foundry and No. 2 soft ..	\$35.90
Southern Ohio, No. 2 .....	34.26
Basic, Northern .....	34.26

**Finished Material.**—A great deal of improvement is noted in outbound shipments as well as those from the mills. While the freight congestion has not yet been cleaned up by any means, the situation is so much more encouraging that the jobbers are working their office and warehouse forces overtime. This condition is exactly opposite from that existing last month at this time and it is now generally believed that warmer weather will bring out considerable business which is yet under cover. Additions to several plants having Government work are contemplated, which means that there is likely to be a good spring demand for structural material of all kinds. Reinforcing concrete rods are being contracted for quite freely, but in medium-sized lots, by builders in this section. The jobbers also report that wire nails from stocks are moving freely and that orders from retail merchants are coming in at a satisfactory rate. There is no change in the high speed steel situation, and it is probable that the majority of the makers are obtaining \$2 per pound, which is the Government's maximum price.

Jobbers' prices are unchanged as follows: Iron and steel bar, 4.08½ c.; twisted bars, ¾ x 1¼-in., 4.23½ c.; ¾-in., 4.33½ c.; ½-in., 4.43½ c.; ¾-in., 4.63½ c., and ½-in., 4.88½ c. Structural shapes are quoted at 4.18½ c.; plates, ¼-in. and heavier, 4.43½ c.; No. 10 blue annealed sheets, 5.43½ c. Cold rolled shafting is sold at 10 per cent discount. The mill price on No. 28 black sheets is 5.18½ c., and No. 28 galvanized 6.43½ c. Wire nails, \$4.10 per keg, base.

**Coke.**—There is no furnace or foundry coke available that is not already due on old contracts, so that new business is very light and will doubtless continue that way for some time to come. The efforts of the oven operators just now are confined to rushing forward shipments to consumers and they are said to be receiving some hearty support from the transportation lines. The shortage of cars is still serious, although occasional reports from the Connellsville district indicate that some improvement is being made in solving this problem. The latest changes in prices in a few fields will have no immediate effect, as practically little coke can be sold for prompt shipment in any producing district. The labor question is still a vexing one in all of the different districts, but is improving to some extent, especially in the Pocahontas and Wise County fields.

**Old Material.**—Shipments to many Cleveland points can now be made, and considerable scrap is also going forward to Pittsburgh territory, although special permits are necessary in the latter case. It is hoped that all embargoes will be raised within the next few days, and should this action be taken it will doubtless cause a readjustment of prices to conform more nearly to the Government's schedule. Dealers are working hard to ship scrap on contracts that are long overdue, and until these contracts are somewhat cleaned up they will hardly take much interest in the market as far as laying in further stocks is concerned. The following are dealers' prices, f.o.b. southern Ohio and Cincinnati:

Per Gross Ton	
Bundled sheet scrap .....	\$19.00
Old iron rails .....	\$32.00 to 32.50
Relaying rails, 50 lb. and up .....	44.00 to 44.50
Rerolling steel rails .....	33.00 to 33.50
Heavy melting steel scrap .....	27.00
Steel rails for melting .....	27.00 to 27.50
Old carwheels .....	28.00
Per Net Ton	
No. 1 railroad wrought .....	\$29.00 to \$29.50
Cast borings .....	14.50 to 15.00
Steel turnings .....	14.50 to 15.00
Railroad cast .....	25.00 to 25.50
No. 1 machinery .....	25.00 to 25.50
Burnt scrap .....	16.50 to 17.00
Iron axles .....	40.00 to 40.50
Locomotive tires (smooth inside) .....	33.50 to 34.00
Pipes and flues .....	19.00 to 19.50
Malleable cast .....	24.00 to 24.50
Railroad tank and sheet .....	17.00 to 17.50



## British Steel Market

### Pig Iron Firm—Sales of American Wire Rods and Steel Bars

(By Cable)

LONDON, ENGLAND, March 6.

The pig iron market is generally firm. American wire rods have sold at £31 10s. in warehouse, Liverpool, and steel bars at £29, c.i.f. Steel sheets have sold at £45, c.i.f. Japan. The tin plate market is firm and the ferromanganese market quiet.

Toluol is quoted at 2s. 3½d. per gal. We quote as follows:

Tin plates coke, 14 x 20; 112 sheets, 108 lb., f.o.b. Wales, 31s. 10½d.

Ferromanganese, \$250, c.i.f. for export to America; £26 10s. for British consumption.

Ferrosilicon, 50 per cent, c.i.f. £35 upward.

On other products control prices are as quoted in THE IRON AGE of July 19, 1917, p. 171.

## Birmingham

BIRMINGHAM, Ala., March 5.

**Pig Iron.**—The Southern pig-iron market is still strong—in fact, so strong that producers are only taking on such business as they see fit, mainly with regular customers, or that which holds out inducements as to delivery, etc. Announcements in reference to recommendations of the committee of the American Iron and Steel Institute to the War Industries Board as to a revision of the iron prices as proposed for March 31 give renewed confidence that the Government is not going to do anything that might disturb the market to any extent. It is not believed that if there is a revision that it will be downward and of a disturbing kind. If there is not a realization of the belief, Southern furnace companies will not be hurt, for the reason that much of the iron sold for delivery after April 1 carries a clause to the effect that there is a right of cancellation. Inquiries are again numerous, following a little lull when it became apparent that furnace companies were going slow on selling. There is reiteration to the statement that if so desired all the iron that could be produced here could be sold within a very short while. Already some of the companies in this section have made little inroads into the probable make of the third quarter of the year and are considering business on the fourth quarter. Production of pig iron in the Southern territory, while showing some improvement over January, is not yet satisfactory, some trouble being experienced because of a shortage of coke and unsteadiness in other fuel. One concern reported one-third of the possible make for a week at least. Railroad car service is better now than it has been in some time, and removal of a few embargoes will bring about a decided change in the general conditions. Many old contracts are being worked on now effectively in this section, and much iron is being handled. The home consumption is still lagging, by reason of one of the larger cast-iron pipe plants being down, and several of the soil-pipe plants and a few machine shops and foundries are running slow, because of a strike on the part of metal trades craftsmen, who are demanding the 8-hr. rule. However, the home melt is not a disturbing factor, the consumers having purchased ahead and not demanding delivery.

**Cast-Iron Pipe.**—While a few specifications have recently been passed out and some of them have been received here, the aggregate business has not yet come in sufficiently to warrant the statement that there is a decided improvement. While the war and the consequent bond issues have affected municipalities in issuing their improvement bonds, there is a certain amount of development that must be done and a certain amount of pipe must be purchased from time to time.

**Coal and Coke.**—While the coal production in Alabama is now at its maximum, there is still need for more. Coke producers are anxious to fill orders as

quickly as they possibly can, but there is no willingness apparent to take on new business.

**Old Material.**—While quotations are not changed for the week in scrap in the South, the market is stronger and brighter prospects are again noted. Car service is good and efforts are being made to land some business from other centers and in territories heretofore supplied by larger markets. Stocks of scrap iron and steel are increasing. Quotations are as follows:

Old steel axles.....	\$32.00 to \$33.00
Old steel rails.....	28.00 to 30.00
Heavy melting steel.....	25.00 to 27.00
No. 1 R. R. wrought.....	27.00 to 30.00
No. 1 cast.....	25.00 to 26.00
Old carwheels.....	25.00 to 30.00
Tramcar wheels.....	21.00 to 25.00
Machine shop turnings.....	17.50 to 19.00
Cast iron borings.....	13.00 to 15.00
Stove plate.....	19.00 to 21.00

## St. Louis

ST. LOUIS, Mo., March 4.

**Pig Iron.**—Many melters are anxious to cover for the last half of the year, and the aggregate sought runs into rather heavy figures, though figures are not available because so many consumers are negotiating rather than inquiring for specific tonnages. Most of the call is for Southern iron, and sales have ranged from 1000 tons downward, but the aggregate for the week will probably not exceed 6000 tons, so slowly are the transactions completed. A new inquiry calls for 10,000 tons of basic for the last half.

**Old Material.**—Dealers are feeling better as the weather and shipping conditions improve and are looking for larger lists from the railroads as the weather permits material to be picked up and cars to be furnished for transportation. The situation, however, in this respect is still far from satisfactory. There is increasing demand from the consumers—steel foundries, steel mills and rolling mills—and there is increasing indication that the yard stocks of the larger concerns are getting lower than they like to have them. The dealers are anticipating an active entry into the market of the consuming interests within the next 30 days and look for transactions on the Government basis plus commission. Scrap lists include Mobile & Ohio, 900 tons, and Kansas City Southern, 500 tons. We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district, as follows:

### Per Gross Ton

Old iron rails.....	\$36.00 to \$36.50
Old steel rails, rerolling.....	34.50 to 35.00
Old steel rails, less than 3 ft.....	37.50 to 38.50
Relaying rails, standard sections, subject to inspection.....	60.00 to 75.00
Old carwheels.....	29.50 to 30.00
No. 1 railroad heavy melting steel scrap.....	29.50 to 30.00
Heavy shoveling steel.....	29.50 to 30.00
Ordinary shoveling steel.....	28.00 to 28.50
Frogs, switches and guards cut apart.....	29.50 to 30.00
Ordinary bundled sheet scrap.....	24.00 to 24.50
Heavy axle and tire turnings.....	22.50 to 23.00

### Per Net Ton

Iron angle bars.....	\$35.50 to \$36.00
Steel angle bars.....	28.50 to 29.00
Iron car axles.....	45.50 to 46.00
Steel car axles.....	43.00 to 43.50
Wrought arch bars and transoms.....	41.50 to 42.00
No. 1 railroad wrought.....	30.75 to 31.25
No. 2 railroad wrought.....	30.00 to 30.50
Railroad springs.....	30.00 to 30.50
Steel couplers and knuckles.....	30.75 to 31.25
Locomotive tires, 42 in. and over, smooth inside.....	36.00 to 36.50
No. 1 dealers' forge.....	26.50 to 27.00
Cast iron borings.....	17.00 to 17.50
No. 1 busheling.....	25.50 to 26.00
No. 1 boilers, cut to sheets and rings.....	23.00 to 23.50
No. 1 railroad cast scrap.....	25.50 to 26.00
Stove plate and light cast scrap.....	20.50 to 21.00
Railroad malleable.....	26.00 to 26.50
Agricultural malleable.....	23.00 to 23.50
Pipes and flues.....	23.50 to 24.00
Heavy railroad sheet and tank scrap.....	22.50 to 23.00
Railroad grate bars.....	19.00 to 19.50
Machine shop turnings.....	17.50 to 17.75
Country mixed scrap.....	20.50 to 21.00
Uncut railroad mixed scrap.....	23.50 to 24.00

**Coke.**—The shipping situation has eased up somewhat in the coke field and deliveries are more satisfactory, though still far from normal. The continuance of good weather is bringing to destination a con-



siderable quantity of coke that has been hung up along the road, and this is helping the melters who have been in an uncomfortable condition since the middle of December.

**Finished Iron and Steel.**—Warehouse material continues to move out as fast as finished goods can be obtained, but this is not sufficient to meet the demand. For stock out of warehouse we quote as follows: Soft steel bars, 4.17c.; iron bars, 4.17c.; structural material, 4.27c.; tank plates, 4.52c.; No. 8 sheets, 5.47c.; No. 10 blue annealed sheets, 5.52c.; No. 28 black sheets, one pass, cold rolled, 6.52c.; No. 28 galvanized sheets, 7.77c.

## San Francisco

SAN FRANCISCO, Feb. 26.

The market for iron and steel products reflects closely the condition of the Eastern market, except for smaller bars and some sizes of plates, which are made in the local mills. Nearly all the material arriving is for Government use, either directly in the shipyards or indirectly in the fabrication of parts which will eventually be incorporated in ships. Jobbers' stocks of materials are constantly becoming lower, with little prospect of renewals in the near future. The pig iron, bar and scrap situation is easier than that of any of the other materials, and if sufficient supplies of coke were available, the Coast could develop its mills to a greater independence of the Atlantic seaboard. While there has been no freight tie-up such as has prevailed in the East, the fact that the sources of supply are all in the East has caused normal receipts to fall far behind what was expected before full realization of the freight congestion was grasped by the local trade. This depletion of stock among jobbers is causing an inclination to decline business except with the Government or an old customer. Without Government fixed prices this would inevitably mean a sharp advance in prices, but no deviation from Government prices is reported.

**Bars.**—The local mills are equipped for making bars, excepting the largest sizes, and as the demand is good and the general scarcity of other material has taken much work from them the local mills have concentrated on this product. For reinforcing bars the market may be said to be lively. There is practically no building going on except of concrete structures.

**Structural Material.**—Demand is almost exclusively for shipyards. Occasionally some necessary railroad bridge work crops up, but this again must be considered Government work. A \$40,000 steel bridge across the Russian River at Duncan's Mills is being projected by the Northwestern Pacific Railroad, but the consent of the Government has not yet been obtained. Some other railroad bridges in contemplation will probably not get beyond the stage of planning and estimating. The stock of structural material in the hands of jobbers is exceedingly low, especially in beams and channels.

**Plates.**—There is very little tonnage moving except for Government contracts. Some tank plate is being fabricated, and this may be increased in quantity, as such work done on the Pacific Coast cuts the number of freight cars to handle the same amount of completed material about one-third. Stock on hand with jobbers is lower than it has been for years.

**Sheets.**—There has been an unusual demand for all gages, particularly the light. Among the jobbers there is a serious shortage of both galvanized and black sheets. They say there is some promise of relief for both the plate and sheet markets; they expect shipments to arrive in a week or two and that depleted stocks may be replaced within the next ninety days.

**Wrought Pipe.**—Demand comes almost exclusively from the shipbuilding plants. A new aviation camp is to be built near San Diego and this is expected to take some wrought pipe. The jobbers have a fair supply on hand, but it is not the sizes needed to a great extent in shipbuilding or in the oil fields. In the latter there is a demand which is not being supplied.

**Cast-Iron Pipe.**—There is very little inquiry for cast-iron pipe. The advance of freight rates, \$5 a ton to California points and \$6 to Oregon and Washington points to take effect on March 15, has had the effect of retarding sales. All recent bids have included a clause making them subject to change in freight rates and this uncertainty has had a dampening effect on the market. While there have been a few small demands for private use there is practically no considerable municipal order in sight. On bids for 260 tons of 12-in. B, which were opened in Los Angeles on Feb. 15, the National Cast Pipe Co. was the lowest bidder and was awarded the contract.

**Pig Iron.**—There appears to be no shortage through the curtailment of shipments. The furnace men are inserting clauses in all contracts for deliveries during the second quarter of the year to the effect that the prices are subject to Government revision at the time of shipment.

**Coke.**—The scarcity continues unrelieved. This is due to the delays in getting supplies from the usual sources, even on contract. The situation is regarded as one of the most serious features, as the industry realizes the difficulty in bringing in the necessary amount from the Atlantic Coast.

**Old Materials.**—There is plenty of scrap on hand, but the market showed a tendency to tighten up during the past two weeks owing to the heavy rainfalls in the mountain districts. These rains have stopped the gathering of old material in California so that recent receipts have been very light. An effort is being made to open up sources of scrap in Mexico and some shipments have been made, but the business seems to languish.

## Buffalo

BUFFALO, March 5.

**Pig Iron.**—There is a noticeable betterment in the supply of empty cars, permitting increased shipment of output and enabling producers to lessen the amount of piling on yards. Railroad embargoes have been lifted to a larger extent, except into Canada, where they are still on to points east of Toronto. The operation of furnaces still continues to be very much hampered by inadequate coke supply. Demand is importunate, but producers are able to satisfy only a very small proportion of it. The chief feature of the market is the urgent request of users for all kinds of iron, which furnacemen are obliged to deny, even to old established customers, many of whom desire to increase their orders for last half. One furnace interest reports its capacity is taken up for 11 to 12 months ahead, and another is entirely out of the market. A third, however, a large producer, reports the sale of 7000 tons during the week for third quarter delivery. We continue the schedule of Government-established prices, as follows, f.o.b. furnace, Buffalo:

No. 1 foundry.....	\$34.50
No. 2 X.....	33.50
No. 3 foundry.....	32.50
Gray forge.....	32.00
Malleable.....	33.50
Basic.....	33.00
Lake Superior charcoal, f.o.b. Buffalo.....	39.75

**Finished Iron and Steel.**—Business in finished products is in a convalescent state owing to improved fuel conditions and shipping facilities, although the railroad situation is not yet free from troublesome features causing embarrassing delays, so that mill output has not yet recovered to full capacity; 65 to 75 per cent is about the average for the current week. There has been an increase in inquiry for plates and bars, and some sales are reported. Inquiry for reinforcing bars has also been very good, including several 1000 ton lots for export. The largest inquiry was for reinforcing bars for shipment to the Canadian northwest, the tonnage involved being several thousand tons. There has been more or less Government purchasing, also a slightly increased activity in commercial demands. It is stated that the furnishing of the steel for the construction of the four lake steamers to be built at the

shipbuilding plant of the Canadian Allis-Chalmers Company at Bridgeburg, Ont., has been guaranteed by the Canadian government. One of the largest local producers reports the sale in the week of 500 tons of plates, principally for tanks, and 1000 tons of bars. In special finished products, other than bars, there has been increased activity, particularly for material required for the equipment of industrial plants, such as shafting, turn-buckles, etc. One local producer of semi-finished steel has sold capacity output for several months ahead on billets and wire rods. There appears to be a pronounced falling off in buying of cast iron pipe by municipalities, most of the current business in this line, which is light, being for military requirements.

**Old Material.**—Considerable tonnages of shell turnings are commencing to come into the market in this district, and dealers understand that a ruling has been made that only the first and second cut of shell turnings may be included and classified as heavy axle and forge turnings—and their equivalent—on which the Government has established a price of \$25, and that the lighter turnings produced from the finishing of shells are to be classified as ordinary machine shop turnings which are covered by the Government price of \$20. Where first and second cuts are not separated from the lighter turnings from shells the entire product of such shell turnings will have to be classified as "machine shop turnings." The possibility of the recently fixed prices being changed again on April 1 is being kept in mind by dealers, and most contracts made are with the proviso that any new price made by the Government is to apply in the contract. The market is less active than for the two weeks past, but a fair amount of trading is reported. There is still a scarcity of heavy melting steel and some shortage of No. 1 railroad and mixed cast scrap. The additional fixing of prices by the Government has entirely eliminated the element of speculation from the market, and one or two commodities are selling slightly under the Government price, No. 1 busheling now selling at \$31 as against the Government price of \$32. The price of No. 1 railroad and machinery cast scrap is now \$35 instead of \$30, the price quoted in recent schedules. We quote dealers' asking prices, per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel.....	\$30.00
Low phosphorus .....	40.00
No. 1 railroad wrought.....	35.00
No. 1 railroad and machinery cast.....	35.00
Iron axles .....	\$45.00 to 47.00
Steel axles .....	45.00 to 47.50
Carwheels .....	30.00
Railroad malleable .....	35.00
Machine shop turnings.....	18.50 to 18.50
Heavy axle turnings.....	25.00
Clean cast borings.....	19.00 to 20.00
Iron rails .....	37.00 to 38.00
Locomotive grate bars.....	25.00
Stove plate .....	25.00
Wrought pipe .....	29.00
No. 1 busheling scrap.....	30.00
No. 2 busheling scrap.....	22.00 to 24.00
Bundled sheet stamping scrap.....	22.00 to 24.00

## New York

NEW YORK, March 6.

**Pig Iron.**—There is a good deal of inquiry for iron, mostly for delivery in the second half, but so far as foundry iron is concerned little business results. Now and then a foundry comes into the market that has Government business on which it did not cover, and apparently its expectation is that a Government order will get it a place on the books of the furnaces. The trouble is that the furnaces already have requisitions on Government account and naturally cannot displace one customer who is doing Government work to make room for a new one in the same category. A round block of basic iron has been put through for a western New York interest which is supplying ingots which ultimately contribute to Government work. Further inquiry from the same source is to be expected in case railroad buying becomes active. A St. Louis plant whose buying is done through New York is in the

market for 10,000 tons of basic iron for the second half. A steel-casting interest with one plant in New England and two on the Delaware River is in the market for second-quarter iron and for a larger amount for the second half. Blast furnace output does not improve markedly. Eastern furnaces are still complaining of coke shortage. We quote as follows for tidewater deliveries, the higher price on Southern iron in each case representing the added lighterage charge. The rail and water freight on Southern iron is \$5.75:

No. 1 X.....	\$35.25
No. 2 X .....	34.25
No. 2 Plain .....	33.75
No. 2 Southern (rail and water)....	\$38.75 to 39.25
No. 2 Southern (all rail).....	39.15 to 39.65
No. 2 X Virginia .....	37.02

**Ferroalloys.**—The domestic ferromanganese market is strong and active at \$250, delivered. In the last week sales are reported of from 5000 to 7000 tons for delivery in the second and third quarters, the largest part of this taken by one consumer. There has been some quiet buying of small lots besides. Inquiry is good, one in particular calling for 300 to 500 tons for delivery in the second quarter. The sales above referred to are the first reported which involve a delivery in the second half. It is reported that the Anaconda Copper Co. is to make ferromanganese in electric furnaces at Butte, Mont., consuming 250 tons of ore a day from mines it owns. While this report is not officially confirmed in New York, it is known that the company has plans for utilizing its manganese supplies. Manganese ore has been sold recently at a new high level. A small lot of Indian ore has gone to a large domestic consumer at \$1.35 per unit. The previous high price was \$1.30 for the same kind of ore. Spiegeleisen is very scarce, being practically unobtainable for any delivery. The nominal quotation is about \$70, furnace, with some producers asking \$75. Ferrosilicon, 50 per cent, is strong at \$170 to \$195 per ton, depending on quantity and delivery. One large producer is reported as offering some at \$155, furnace. A new producer will soon be making this alloy in the Niagara Falls district, but the output will not be large. The United States Alloy Co. has made arrangements to increase its power consumption by 50 per cent. Ferrotungsten is quoted at \$2.25 to \$2.35 per lb. of contained tungsten, New York, with the ore concentrates selling at between \$20 to \$26 per unit in 60 per cent material, depending on the grade. Ferrovanadium ranges nominally from \$4 to \$5, Pittsburgh, per lb. of contained vanadium for prompt delivery in small lots, but very little is available, large quantities going into steel on Government orders. Ferro-carbon-titanium, 15 to 18 per cent, is selling at 8c. per lb. in carload lots, 10c. per lb. in ton lots and 12½c. per lb. in lots less than a ton, f.o.b. Suspension Bridge, N. Y.

**Finished Iron and Steel.**—No transactions of importance are noted. Accumulations of finished product are far from being materially reduced at mills. One of the largest Pennsylvania steel mills, which did not receive the checks on account of fuel shortage as early as the Pittsburgh and Youngstown districts is now operating at only 60 per cent of capacity. An authoritative estimate puts plate capacity of the country of 3/16 in. and thicker at between 5,000,000 and 6,000,000 tons per annum and that in two or three months shipbuilding interests will have more plates than necessary. Fully 40 per cent of the total manufactured is regarded as available for shipbuilding purposes. In view of this it is interesting that one mill has decided not to entertain a proffer of 5000 tons of plates for export at 3.75c. In the interest of Norway an attempt is being made to order 1200 tons for rolling as soon as possible with payment to be made on completion of the rolling at 4.50c. mill, the plates to remain in storage until they can be released at the termination of the war. At least one mill has refused the business. A sidelight on the belief that prices after April 1 will not be lowered is indicated in the inclusion on definite orders by one plate mill of a clause that prices on unshipped portions are subject to price revision after April 1; it will be recalled that this adjustment feature was agreed to last December when first-quarter prices were affirmed, but was made ap-



plicable only to contracts as distinguished from specific or current business as in the present case. Not much in fabricated work has come up but there are signs that in about two months there will be a considerable additional Government demand. Two lots of work have been closed for the powder plant at Charleston, W. Va.; 1100 tons to the Central States Bridge Co. and 1000 tons to the Nashville Bridge Co. Other awards include 1200 tons for the Anaconda Copper Mining Co., to the American Bridge Co. and 400 tons for the Tennessee Valley Iron & Railroad Co., to Hansell-Elcock Co. The Southern Railway has asked for bids on a plate girder viaduct taking 1100 tons. We quote mill shipments of steel bars at 3.095c., New York; shapes, 3.195c., plates 3.445c. and bar iron 3.695c., New York. Out-of-store prices are 1c. higher.

**Old Material.**—There is a good demand from nearby foundries, particularly in Connecticut, for No. 1 machinery cast scrap, but these consumers as a rule have not yet been willing to pay the full maximum price of \$35 per gross ton, delivered, plus the 3½ per cent commission, which most brokers and dealers demand. We continue to quote No. 1 machinery cast at \$32.80, New York, for foundry use. The movement of heavy melting steel to eastern Pennsylvania and Pittsburgh districts is not large owing to the difficulties in obtaining cars and shipping permits. Owing to the need for heavy melting steel in the Pittsburgh district the specifications from steel plants there are less rigid than those from eastern Pennsylvania mills, hence it is likely that shipments to Pittsburgh will be in increasing volume as railroad congestion loosens up. The minimum quoted below on heavy melting steel is the price obtained f.o.b. New York on Pittsburgh shipments, and the maximum applies on shipments taking the eastern Pennsylvania freight rate. Prices based on the new schedule announced by the Committee on Steel and Steel Products of the American Iron and Steel Institute to New York producers and dealers are as follows:

Heavy melting steel.....	\$26.70 to \$27.75
Rerolling rails .....	32.60
Relaying rails .....	60.00 to 70.00
Iron and steel car axles.....	45.00
No. 1 railroad wrought.....	32.75
No. 1 railroad wrought cut to not less than 10 in. or over 24 in.....	37.80
Wrought-iron track scrap.....	32.80
No. 1 yard wrought long .....	31.80
Light iron .....	9.00 to 10.00
Cast borings (clean) .....	17.80
Machine-shop turnings .....	17.80
Mixed borings and turnings.....	14.50 to 15.50
Iron and steel pipe (1 in. minimum diameter), not under 2 ft. long.....	30.75

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, are:

No. 1 machinery cast .....	\$32.80
No. 1 heavy cast (columns, building materials, etc.) .....	27.80
No. 2 cast (radiators, cast boilers, etc.).....	27.80
Stove plate .....	\$22.00 to 22.50
Locomotive grate bars.....	22.00 to 22.50
Malleable cast (railroad).....	32.80
Old carwheels .....	27.80

**Cast-Iron Pipe.**—Private business has shown no falling off in volume, but no new public work is reported. No changes in Government prices is expected and they are as follows: \$55.35, New York, for 6-in. and heavier, and \$58.35 for 4-in.; \$65.35 for 3-in. and \$1 additional for class A and gas pipe.

A new way to make iron or steel rust-proof is claimed in a patent (U. S. 1,248,053) issued to William H. Allen of Detroit. Vapors containing phosphorus compounds are made use of. The process consists in subjecting articles of iron and steel, properly cleaned by pickling or sand blast, to the fumes or vapors of phosphorus pentoxide or anhydride, together with some aqueous vapor until surfaces of basic phosphates of iron are produced. These vapors may be produced in any desired manner, the preferred process consisting in subjecting a mixture of ground phosphate rock, coke and sand to a strong current in an electric furnace. The liberated phosphorus immediately changes to P<sub>2</sub>O<sub>5</sub>, and these fumes are drawn into the processing chamber by means of a suction fan. The fumes may be first passed through a dust chamber.

IRON AND INDUSTRIAL STOCKS

Possible Peace No Longer a Basis for Trading—  
Baldwin Locomotive Very Active

The discrepancies between German peace talk and military operations have killed for the time being any tendency to boost prices on a peace basis. Market sentiment last week was confused. For the most part steel shares fell off slightly: Bethlehem Steel, com., 1½ point; class B, 2; 8's pref., ¾; Crucible Steel, com., 1½; Gulf States Steel, 2½; Midvale Steel, ¾; Republic Iron & Steel, com., 1½; pref., 1½; Superior Steel, 1; United States Steel, com., ¾; pref., ½. On the other hand, some sales of Lackawanna Steel, com., were made at ½ point increase; Crucible Steel, pref., ¼ point higher; United Alloy Steel, com., ½ point. The stocks of the metal-working industrials in nearly every case recorded a small drop in value. A notable exception was Baldwin Locomotive, com., which advanced 1½ points on a sale of 279,200 shares, and aggregated larger total transactions than any stock except U. S. Steel, com.

The range of prices on active iron and industrial stocks from Tuesday of last week to Wednesday of this week was as follows:

Allis-Chalm. com. 24½-28½	General Electric. 139 -143½
Allis-Chalm. pf. 80 -81½	Gt. N. Ore Cert. 27½-29½
Am. Can com. 39½-42½	Int. Har. of N. J. com. 123½-123¾
Am. Can pf. 94½-95	Int. Har. of N. J. pf. 123½-125
Am. Car & Fdry. com. 73½-79½	Lacka. Steel. 76½-80
Am. Car & Fdry. pf. 107	Lake Super. Corp. 15½-16½
Am. Loco. com. 64½-68	Midvale Steel. 44½-45½
Am. Loco. pf. 99½-99¾	Nat. Acme. 29½-29¾
Am. Radiator com. 260	Nat. En. & Stm. com. 48 -52¾
Am. Ship com. 90¾-99	N. Y. Air Brake. 121 -138
Am. Ship pf. 90½-90¾	Press. Steel com. 60¾-62½
Am. Steel Fdries. 63½-66¾	Pressed Steel pf. 96¾-96¾
Bald. Loco. com. 75 -80½	Ry. St. Spr. com. 53 -55½
Bald. Loco. pf. 100	Republic com. 76 -80
Beth. Steel com. 79½-83¾	Republic pf. 97½-98¾
Beth. Stl. Cl. B. 77½-82¾	Sloss com. 50 -52
Beth. Steel pf. 92	Sloss pf. 81
Case (J. I.) pf. 85	Superior Steel. 35½-37
Cent. Fdry. com. 27 -29	Transue-Wms. 40
Cent. Fdry. pf. 41¾-43	Un. Alloy Steel. 39½-39¾
Chare. Iron, com. 8½-8¾	U. S. Pipe com. 13½-15½
Chare. Iron pf. 6¾-7	U. S. Pipe pf. 44 -44½
Chic. Pn. Tool. 51½-53	U. S. Steel com. 89½-98
Col. Fuel 38 -39¾	U. S. Steel pf. 109¾-110¾
Cruc. Steel com. 61 -66½	Va. I. C. & C. 64 -64½
Cruc. Steel pf. 89 -89¾	Westingh. Elec. 41 -42¾
Deere & Co. pf. 94½-95½	

Progress of Penn Seaboard Steel in 1917

The Penn Seaboard Steel Corporation, Philadelphia, did a gross business of \$10,544,000 in 1917 on which the net profit was \$1,045,000 after deducting operating expenses, repairs, renewals, depreciation, income taxes and reserves for excess profits taxes. Two note issues of \$500,000 each were paid off and dividends of \$240,000 were paid, but notwithstanding surplus to profit and loss increased \$479,000 and current and fixed assets increased \$2,220,000.

The funds received from the sale of the Seaboard Steel Castings Co. to the American Locomotive Co. were expended upon its three other plants. The company's total steel making capacity has been increased 43 per cent. President Rodney Thayer states that very large charges have been made for repairs, renewals, rebuilding of furnaces, etc., which were included in manufacturing costs.

Orders on hand assure full operation of its plants for at least four months. Arrangements have been completed for installation at the New Castle plant of machinery for the manufacture of plates for ships, locomotives and cars, involving an expenditure of approximately \$2,000,000, which has been approved by the board and arranged for by the sale of bonds.

Interstate Iron & Steel Co.'s Good Showing

The annual report of the Interstate Iron & Steel Co., Chicago, the first to be made public, shows that last year it earned at the rate of 24.7 a share on the \$4,000,000 outstanding common stock. Net profits were \$1,050,686, and after the payment of \$61,658 preferred



dividends the remainder was carried to surplus, which now totals \$1,151,767.

pared with 811,126 gross tons in 1916. The statement follows:

*Comparative Statement of Income Account*

	1917	1916	Increase	Decrease
Total net earnings of all properties.....	\$19,793,916.85	\$16,090,858.18	\$3,703,058.67	
Deduct:				
Interest on bonds and other obligations, including premium on bonds retired and gold notes redeemed:				
Lackawanna Steel Co.....	\$1,285,356.71	\$1,445,194.37		\$159,837.66
Subsidiary companies .....	191,379.16	303,316.68		111,937.52
Rentals and royalties.....	8,542.72	101,536.00		92,993.28
	\$1,485,278.59	\$1,850,047.05		\$364,768.46
Balance .....	\$18,308,638.26	\$14,240,811.13	\$4,067,827.13	
Less—appropriations:				
For extinguishment of mines and mining investments.....	\$412,603.28	\$368,729.91	\$43,873.37	
For depreciation and accruing renewals.....	1,789,058.76	1,653,846.67	135,212.09	
	\$2,201,662.04	\$2,022,576.58	\$179,085.46	
Profit for the year.....	\$16,106,976.22	\$12,218,234.55	\$3,888,741.67	
Lackawanna, N. Y., Feb. 26, 1918.				

President Llewellyn in a statement to shareholders said, in explaining the withholding of dividends, that in view of the unsettled financial condition and many unknown factors in the business situation, the directors believed it would be in the best interests of the stockholders to conserve the company's cash resources. Referring to the company's operations Mr. Llewellyn added:

"This is the first year of our enlarged activities and has been profitable and satisfactory. Our new open-hearth steel capacity was put into operation in July and August and has been doing work from that time."

Before December, 1916, there were no public holding of the stock of the company. In that month, however, \$1,000,000 of preferred and \$2,500,000 of first mortgage serial sinking fund gold bonds were floated to finance the purchase of the Grand Crossing Tack Co. The balance sheet as of Dec. 31, 1917, follows:

<i>Assets</i>	
Land, plant, etc.....	\$6,364,366
Depreciation reserve .....	523,978
Proportion of abnormal cost of construction during 1917 written off.....	44,450
Balance plant account.....	5,795,938
Inventories .....	1,813,608
Accounts and bills received less reserve.....	1,082,403
Liberty bonds .....	475,000
United States treasury certificates.....	500,000
Cash .....	210,431
Deferred charges .....	8,617
Total.....	\$9,885,999
<i>Liabilities</i>	
Preferred stock .....	\$1,000,000
Less held in treasury.....	133,400
Common stock .....	4,000,000
Bonds .....	2,500,000
Less retired during year.....	125,000
Less purchased and held in treasury.....	186,000
Accounts payable .....	402,487
Reserve for accident liability.....	25,342
General taxes and interest accrued.....	49,139
Provision for federal tax.....	700,000
Reserves .....	502,661
Surplus:	
Adjusted balance Jan. 1, 1917.....	162,739
Net income for year.....	1,050,686
Dividends paid on preferred stock.....	61,658
Surplus .....	1,151,767
Total.....	\$9,885,999

Plant additions amounted to \$871,434 and \$475,000 of Liberty bonds and \$500,000 of treasury certificates are being carried.

#### Lackawanna Steel Co. Earnings

A statement of earnings just issued by the Lackawanna Steel Co. for the year 1917 shows that the net earnings for that year amounted to \$19,793,917; an increase of \$3,703,058 compared with 1916. The rate of profit on the common stock was 45.89 per cent in 1917 and 34.31 per cent in 1916. The unfilled orders at the end of last year were 731,536 gross tons com-

#### Deere & Co. Earnings

Deere & Co., Moline, Ill., earned a surplus after all charges of \$2,413,570 as compared with \$1,469,998 in 1916, the annual report for 1917 shows. Net earnings of all the companies were \$5,851,129 as against \$4,783,081 in 1916. The comparative financial statements follow:

<i>Income Account</i>		1917	1916
Earnings of all companies.....	\$5,851,129	\$4,783,081	
Administration and general expenses..	651,286	503,327	
Interest charges .....	94,363	162,990	
Depletion of timber lands.....	173,454	98,771	
Preferred dividends .....	2,518,454	2,647,995	
Year's surplus .....	2,413,570	1,469,998	
Previous surplus .....	7,434,035	5,964,037	
Total surplus Oct. 31.....	9,847,605	7,434,035	

#### Industrial Finances

At the annual meeting of the American Manganese Mfg. Co., at Philadelphia recently, a partial annual report was submitted, showing that profit for 1917 was \$897,411.45; while the total surplus at the end of the year was \$1,258,137.51 against \$454,231.12.

The annual meeting of the stockholders of the Wheeling Steel & Iron Co., was held in Wheeling, W. Va., last week. The secretary's report showed the company to be in a highly prosperous condition. The more important figures were: Net earnings, \$8,551,519.66; interest and investments, \$288,581.70; net profits, \$4,187,911.00; net surplus, \$6,205,569.01; payrolls, \$5,146,747.45. The shipments for the year totaled \$27,964,341.58 as compared with a 1916 total of \$15,073,530.78. Dividends of 13 per cent cash and 20 per cent stock were paid in 1917.

#### Dividends

The American Car & Foundry Co., quarterly, 1 per cent and extra 1 per cent on the common and 1¼ per cent on the preferred, payable April 1.

The American Locomotive Co., quarterly, 1¼ per cent on the common, payable April 3 and 1¼ per cent on the preferred, payable April 22.

The J. I. Case Threshing Machine Co., quarterly, 1¼ per cent on the preferred, payable April 1.

The Lackawanna Steel Co., quarterly, 1½ per cent, payable March 30.

The La Belle Iron Works, quarterly, 1 per cent and extra 2 per cent on the common, and 2 per cent on the preferred, payable March 30.

The Railway Steel Spring Co., quarterly, 1¼ per cent on the common, payable March 30, and 1¼ per cent on the preferred, payable March 20.

The Underwood Typewriter Co., quarterly, 1½ per cent on the common and 1¼ per cent on the preferred, payable April 1.

The Worthington Pump & Machinery Corporation, quarterly, 1¼ per cent on preferred A and 1½ per cent on preferred B, payable April 1.

The Yale & Towne Mfg. Co., quarterly, 2½ per cent, payable April 1.

# Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight rates from Pittsburgh on iron and steel articles, aside from wrought iron and steel pipe in carloads, per 100 lb., New York, 19.5c.; Philadelphia, 18.5c.; Boston, 21.5c.; Buffalo, 11.6c.; Cleveland, 13.5c.; Cincinnati, 18.5c.; Indianapolis, 20c.; Chicago, 21.5c.; St. Louis, 27c.; Kansas City, 47c.; minimum carload, 36,000 lb.; St. Paul, 40c.; minimum carload, 36,000 lb.; Denver, 79c.; minimum carload, 36,000 lb.; Omaha, 47c.; minimum carload, 36,000 lb.; New Orleans, 30.7c.; Birmingham, 46c.; Pacific Coast, 75c.; minimum carload, 80,000 lb. To the Pacific Coast the rate on steel bars and structural steel is 90c., minimum carload, 40,000 lb.; and 85c., minimum carload, 50,000 lb. On wrought iron and steel pipe the rate from Pittsburgh to Kansas City is 40c. per 100 lb., minimum carload 46,000 lb.; to Omaha, 40c., minimum carload 46,000 lb.; to St. Paul, 35.5c., minimum carload 46,000 lb.; Denver, 79c., minimum carload 46,000 lb. A 3 per cent transportation tax now applies.

## Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in. angles, 3 to 6 in. on one or both legs, 1/4 in. thick and over, and zees, structural sizes, 3c.

## Wire Products

Wire nails, \$3.50 base per keg; galvanized, 1 in. and longer, including large-head barb roofing nails taking an advance over this price of \$2, and shorter than 1 in., \$2.50. Bright basic wire, \$3.35 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$3.25; galvanized wire, \$3.95; galvanized barb wire and fence staples, \$4.35; painted barb wire, \$3.65; polished fence staples, \$3.65; cement-coated nails, \$3.40 base; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 47 per cent off list for carload lots, 46 per cent for 1000-rod lots, and 45 per cent off for small lots, f.o.b. Pittsburgh.

## Bolts, Nuts and Rivets

Large rivets ..... \$4.65 base  
7/16 in. x 6 in. smaller and shorter rivets, 45-10 per cent off list  
Machine bolts h.p. nuts, 5/8 in. x 4 in.:  
Smaller and shorter, rolled threads, 50-10-5 per cent off list  
Cut threads ..... 50-5 per cent off list  
Larger and longer sizes, 40-10 per cent off list  
Machine bolts c.p.c. and t. nuts, 3/4 in. x 4 in.:  
Smaller and shorter, 40-10 per cent off list  
Larger and longer, 35-5 per cent off list  
Carriage bolts, 3/4 in. x 5 in.:  
Smaller and shorter, rolled threads, 50-5 per cent off list  
Cut threads ..... 40-10 per cent off list  
Larger and longer sizes, 40 per cent off list  
Lag bolts ..... 50-10 per cent off list  
Plow bolts, Nos. 1, 2, 3, ..... 50 per cent off list  
Hot pressed nuts, sq. blank, 2.50c. per lb. off list  
Hot pressed nuts, hex. blank, 2.30c. per lb. off list  
Hot pressed nuts, sq. tapped, 2.30c. per lb. off list  
Hot pressed nuts, hex. tapped, 2.10c. per lb. off list  
C.p.c. and t. sq. and hex. nuts, blank, 2.25c. per lb. off list  
C.p.c. and t. sq. and hex. nuts, tapped, 2.00c. per lb. off list  
Semi-finished hex nuts:  
5/8 in. and larger, 60-10-10 per cent off list  
9/16 in. and smaller, 70-5 per cent off list  
Stove bolts ..... 70-10 per cent off list  
Stove bolts ..... 2 1/2 per cent extra for bulk  
Tire bolts ..... 50-10-5 per cent off list  
The above discounts are from present lists now in effect.  
All prices carry standard extras.

## Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, \$57; chain rods, \$65; screw, rivet and bolt rods and other rods of that character, \$65. Prices on high carbon rods are irregular. They range from \$70 to \$80, depending on carbons.

## Railroad Spikes and Track Bolts

Railroad spikes, 9/16 in. x 4 1/2 in. and heavier, per 100 lb., \$3.90, in lots of 200 kegs of 200 lb. each, or more; track bolts, \$4.90. Boat spikes, \$5.25 per 100 lb., f.o.b. Pittsburgh.

## Terne Plate

Effective Nov. 7 prices on all sizes of terne plates are as follows: 8-lb. coating, 200 lb., \$15 per package; 8-lb. coating, 1 C., \$15.30; 12-lb. coating, 1 C., \$16.75; 15-lb. coating, 1 C., \$17.75; 20-lb. coating, 1 C., \$19; 25-lb. coating, 1 C., \$20; 30-lb. coating, 1 C., \$21; 35-lb. coating, 1 C., \$22; 40-lb. coating, 1 C., \$23 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

## Iron and Steel Bars

Steel bars at 2.90c. from mill, and 4.50c. to 5c. from warehouse in small lots for prompt shipment. Refined iron bars, 3.50c. in carload and larger lots, f.o.b. mill.

## Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card, as announced Nov. 5 by the Government on steel pipe, those on iron pipe being the same as quoted for some time:

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
1 1/8, 1/4 and 3/8	44	17 1/2	1 1/8 and 1/4	23	+4
1/2	48	33 1/2	3/8	24	+3
3/4 to 3	51	37 1/2	1/2	28	10
			3/4 to 1 1/2	33	17
Lap Weld			Lap Weld		
2	44	31 1/2	1 1/4	18	3
2 1/2 to 6	47	34 1/2	1 1/2	25	11
7 to 12	44	30 1/2	2	26	12
13 and 14	34 1/2	..	2 1/2 to 6	28	15
15	32	..	7 to 12	25	12
Butt Weld, extra strong, plain ends			Butt Weld, extra strong, plain ends		
1 1/8, 1/4 and 3/8	40	22 1/2	1 1/8, 1/4 and 3/8	22	5
1/2	45	32 1/2	1/2	27	14
3/4 to 1 1/2	49	36 1/2	3/4 to 1 1/2	33	18
2 to 3	50	37 1/2			
Lap Weld, extra strong, plain ends			Lap Weld, extra strong, plain ends		
2	42	30 1/2	1 1/4	19	4
2 1/2 to 4	45	33 1/2	1 1/2	25	11
4 1/2 to 6	44	32 1/2	2	27	14
7 to 8	40	26 1/2	2 1/2 to 4	29	17
9 to 12	35	21 1/2	4 1/2 to 6	28	16
			7 to 8	20	8
			9 to 12	15	3

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent. Prices for less than carloads are four (4) points lower basing (higher price) than the above discounts on black and 5 1/2 points on galvanized.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers are seven (7) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe are nine (9) points lower (higher price).

## Boiler Tubes

The following are the prices for carload lots, f.o.b. Pittsburgh, announced Nov. 13, as agreed upon by manufacturers and the Government:

Lap Welded Steel		Charcoal Iron	
3 1/2 to 4 1/2 in.	34	3 1/2 to 4 1/2 in.	12 1/2
2 1/2 to 3 1/4 in.	24	3 to 3 1/4 in.	+ 5
2 1/4 in.	17 1/2	2 1/2 to 2 3/4 in.	+ 7 1/2
1 3/4 to 2 in.	13	2 to 2 1/4 in.	+ 22 1/2
		1 1/4 to 1 1/2 in.	+ 35
Standard Commercial Seamless—Cold Drawn or Hot Rolled		Standard Commercial Seamless—Cold Drawn or Hot Rolled	
Per Net Ton		Per Net Ton	
1 in.	\$340	1 1/4 in.	\$220
1 1/4 in.	280	2 to 2 1/4 in.	190
1 3/4 in.	270	2 1/2 to 3 1/4 in.	180
1 1/2 in.	220	4 in.	200
		4 1/2 to 5 in.	220

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiation.

## Sheets

Makers' price for mill shipments on sheets of United States standard gage in carload and larger lots, are as follows, 30 days net or 2 per cent discount in 10 days:

Blue Annealed—Bessemer		Blue Annealed—Bessemer	
Cents per lb.		Cents per lb.	
Nos. 8 and heavier	4.20	Nos. 17 to 21	4.80
Nos. 9 and 10	4.25	Nos. 22 and 24	4.85
Nos. 11 and 12	4.30	Nos. 25 and 26	4.90
Nos. 13 and 14	4.35	No. 27	4.95
Nos. 15 and 16	4.45	No. 28	5.00
		No. 29	5.10
		No. 30	5.20
Box Annealed, One Pass Cold Rolled—Bessemer		Galvanized Black Sheet Gage—Bessemer	
Nos. 17 to 21	4.80	Nos. 10 and 11	5.25
Nos. 22 and 24	4.85	Nos. 12 and 14	5.35
Nos. 25 and 26	4.90	Nos. 15 and 16	5.50
No. 27	4.95	Nos. 17 to 21	5.65
No. 28	5.00	Nos. 22 and 24	5.80
No. 29	5.10	Nos. 25 and 26	5.95
No. 30	5.20	No. 27	6.10
		No. 28	6.25
		No. 29	6.50
		No. 30	6.75
Tin-Mill Black Plate—Bessemer		Tin-Mill Black Plate—Bessemer	
Nos. 15 and 16	4.80	Nos. 15 and 16	4.80
Nos. 17 to 21	4.85	Nos. 17 to 21	4.85
Nos. 22 to 24	4.90	Nos. 22 to 24	4.90
Nos. 25 and 27	4.95	Nos. 25 and 27	4.95
No. 28	5.00	No. 28	5.00
No. 29	5.05	No. 29	5.05
No. 30	5.05	No. 30	5.05
Nos. 30 1/2 and 31	5.10	Nos. 30 1/2 and 31	5.10

## Metal Markets

### The Week's Prices

		Cents Per Pound for Early Delivery					
		Copper, New York	Tin, Electrolytic	New York	Lead, New York	St. Louis	Spelter, New York
Feb.	Lake						
27	23.50	23.50	*85.00	7.25	7.10	7.87½	7.62½
28	23.50	23.50	*85.00	7.25	7.10	7.87½	7.62½
Mar.							
1	23.50	23.50	*85.00	7.25	7.10	7.87½	7.62½
2	23.50	23.50	*85.00	7.25	7.10	7.87½	7.62½
4	23.50	23.50	*85.00	7.25	7.10	7.87½	7.62½
5	23.50	23.50	*85.00	7.25	7.10	7.87½	7.62½

\*Nominal.

NEW YORK, March 6.

All the markets are quiet and featureless. The scarcity of copper continues but it is lessening. Tin is active and strong for future delivery, but spot metal is nominal. Lead is fairly active and firm. Spelter is lifeless and lower. Antimony is unchanged. Aluminum prices have been fixed by the Government.

### New York

**Copper.**—The scarcity of metal continues but it is not quite so pronounced as a week or two ago. Producers are still disinclined to make sales much beyond their present bookings, though demand is strong. The copper scarcity is a result of the many abnormal conditions resulting from railroad congestion, severe winter and other causes. No one is reported to have suffered from lack of metal, though one large mill is said to be anxious as to its supplies. Production in February is reported as having been higher relatively than in January. The Government prices of 23.50c. per lb. for car load and larger lots and of 24.67½ c. for less than carloads rule the market absolutely.

**Tin.**—The tin market the past week has been very quiet with the exception of yesterday, Tuesday, when a fair business was done in futures, principally April and May shipment from the East. There were also transactions in Banca tin. Spot metal continues nominal at 85c., New York, and practically unobtainable. Arrivals up to yesterday inclusive were 385 tons with the quantity afloat not reported. The London market has changed but little in the week, the quotation for spot Straits having been £319 5s. yesterday against £319 10s. a week ago.

**Lead.**—Some surprise has been in evidence in the market over the advance to 7.25c. last week by the leading producers. No adequate reason has been offered in the gossip. It is believed however that, if the market goes to 7.50c. or over, the Government will fix a price. There has been a fair inquiry in the week and business has been done at 7.25c., New York, for shipment from the West. Spot lead has been sold at 7.50c. to 7.75c., New York. One dealer reports a sale of 14 tons of spot metal at 8c., New York. Western shipments are subject to embargoes but the buyers must obtain the permits.

**Spelter.**—The market continues to drag, with supply apparently in excess of demand. Quotations are a little lower than a week or so ago, prime Western being quoted at 7.62½c. St. Louis or 7.87½c. New York, for early delivery. This can be shaded, some say, to 7.50c. St. Louis. Spot metal is stated to be scarce in this district, due to various causes, and has brought as high as 8.25c. New York. The 500 tons of Grade C for the Government referred to last week has gone at 7.90c., New York basis. Demand in general is exceedingly light, outside of Government needs. The official prices for Grade A zinc is 12c. per lb., with sheet zinc at 15c. per lb.

**Antimony.**—Although two 25-ton lots recently went at 13.25c. New York, duty paid, no more seems to be available at that price, and the market continues at 13.50c. for prompt and early delivery, for Chinese and Japanese grades.

**Aluminum.**—A price of 32c. per lb. New York for virgin metal, 98 to 99 per cent pure, has been fixed

by the War Industries Board and the producers, effective until June 1. The open market quotation up to this had been 36c. to 39c. per lb. New York. Demand, outside of Government needs, is not large. The new price refers to 50-ton lots or more, and nothing is said about smaller amounts.

**Old Metals.**—The market is quiet. Dealers' selling prices are nominally as follows:

	Cents per lb.
Copper, heavy and crucible (nominal)	23.50
Copper, heavy and wire (nominal)	23.50
Copper, light and bottoms	21.00 to 21.50
Brass, heavy	16.75 to 17.00
Brass, light	12.25 to 12.50
Heavy machine composition	24.00 to 24.25
No. 1 yellow rod brass turnings	13.50 to 14.00
No. 1 red brass or composition turnings	19.00 to 20.00
Lead, heavy	6.50 to 6.75
Lead, tea	5.25
Zinc	6.00

### Chicago

MARCH 5.—Interest in the metal market centers in the shortage of copper and tin, transportation difficulties being responsible for this situation. Many brass foundries are suffering for want of material deliveries, being not much better than when several feet of snow covered the ground. The other metals are easily obtainable and quiet. We quote: Copper, 23.50c. in carloads and 24.67½c. for part carloads; tin, 88c.; spelter, 7.70c.; lead, 7.25c.; antimony, 15.50c. to 16c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 21c.; copper clips, 20c.; copper bottoms, 19c.; red brass, 20c.; yellow brass, 14.50c.; lead pipe, 5.50c.; zinc, 5.25c.; pewter, No. 1, 42.50c.; tin foil, 50c., and block tin, 57.50c.

### St. Louis

MARCH 4.—Non-ferrous metals have been rather quiet and in some cases scarce, with prices well held at the figures quoted. The close on carload lots to-day was as follows: Lead, 7.25c.; spelter, 7.75c. On less than carload business quotations were as follows: Lead, 7.75c.; spelter, 8.50c.; tin, 90c.; copper, 25.12c.; Asiatic antimony, 17.50c. In the Joplin district zinc blende was firm at \$50 to \$65 per ton, basis of 60 per cent metal, with the average for the week for the district \$55 per ton. Shipments are still interfered with by the lack of cars, and although the Government has fixed the price on Grade A spelter, as yet this has had no material effect on zinc blende or the prime Western grade. One explanation passing in zinc circles for the failure of the metal to rise is the tremendous effectiveness of the salvage work behind the lines in France, which is recovering so much metal for renewed use and thereby saving on the new metal required. Calamine was quiet at \$32 to \$35 per ton, basis of 40 per cent metal. The average for the week for the district was \$33 per ton. Lead ore was quiet but strong at \$85 per ton, with the average for the week, basis of 80 per cent metal, \$85 for the district. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 10c.; heavy yellow brass, 14c.; heavy red brass and light copper, 19.50c.; heavy copper and copper wire, 20c.; pewter, 25c.; tin foil, 50c.; lead, 6c.; spelter, 5c.; tea lead, 5c.

### Meeting of Waste Material Dealers

The National Association of Waste Material Dealers will hold its annual meeting at the Hotel Astor, New York, on March 19 and 20. The metal division will hold its session at 2 p. m. March 19. F. W. Reidenbach will preside. On the evening of March 20 will be held the annual banquet.

At the meeting of the Philadelphia Foundrymen's Association at the Manufacturers' Club, March 6, Frank D. Chase, Industrial Engineer, Chicago, gave an illustrated talk on "Efficient Plants of the Modern Foundryman." Special emphasis was put on the matter of laying out the foundry for economical handling of material, labor-saving devices and equipment which may be incorporated as part of the building. A special point was made of foundry roof construction to prevent condensed water drops from falling on molds and ruining them.



## OBITUARY

A. RUSSEL CALDER, for 35 years connected with the old Pennsylvania Steel Co., Steelton, Pa., and well known in the steel industry in Pennsylvania, died at Harrisburg, aged 60 years. He started his career in the steel business with the Pennsylvania Steel Co. in 1883. His first duty was to assist in the first heat of basic Bessemer steel made in the United States. He was later transferred to the open hearth, where he learned the business and was made superintendent of the department in 1888. The following year he was given charge of the development of the basic open-hearth process and in 1895 of the furnaces making steel for castings, tool steel and special steels. Mr. Calder was educated in the public schools of Harrisburg and Pennsylvania State College, where he graduated in 1877.

HENRY GRAHAM BROWN, vice-president Brown & Co., Inc., operating the Wayne Iron & Steel Works at Pittsburgh, died suddenly in an automobile in that city on Tuesday afternoon, March 5, having been stricken with heart disease. He was born in Philadelphia in 1853 and was graduated from Haverford College. Going to Pittsburgh about 40 years ago, he entered the employ of his father in the iron business, the concern then being known as John H. Brown & Co. Later, with his brother, J. Stuart Brown, and James Neale, he took over this business and the present corporation was formed. The company manufactures iron bars. Mr. Brown was a member of the Pittsburgh Club, the Duquesne Club, the Allegheny Country Club and the Pittsburgh Golf Club.

WILLIAM P. MURRAY, a member of the firm of Pickands, Mather & Co., pig iron, iron ore and coal dealers, Cleveland, Ohio, died Feb. 28, after an illness of nearly two years, aged 52 years. He had been a member of the firm from the time of its formation, about 35 years ago, and devoted his attention almost wholly to the coal end of the firm's business. He was prominently identified in the Cleveland Athletic Club, of which he was president for six years. Mr. Murray owned a large stock farm, and was formerly president of the Gentlemen's Driving Club in Cleveland.

HENRY B. NEWHALL, formerly of New York and Plainfield, N. J., but in recent years making his home at Littleton, N. H., died Feb. 16, after a long illness. He was born in 1846 at Concord, N. H. He came to New York in the early seventies and was for many years well known in the hardware, iron and steel and machinery lines. He was president of the Newhall Chain, Forge & Iron Co., the New Jersey Foundry & Machine Co., the Diamond Expansion Bolt Co. and the Garwood Co.

HENRY S. CHASE, head of the Chase Metal Works, Chase Rolling Mill Co. and other Chase interests in Waterbury, Conn., died in that city March 4, following an operation for appendicitis. He was 63 years old and was one of the most prominent figures in the brass industry of the country. He was graduated from Yale University in 1877 and at the time of his death was an officer and director in many banking and industrial companies.

E. ROBERT COX, connected for 35 years with the Philadelphia office of the Pennsylvania Steel Co., died at his home in that city March 4, aged 55 years.

### Swedish Iron Ore Exports

Swedish exports of iron ore from Oxelösund from Jan. 1, 1917, to Dec. 15, 1917, are reported to have been 1,175,000 tons as compared with 1,459,000 tons in the same period in 1916 and only 663,000 tons in the same time in 1914. It is assumed that practically all of this ore went to Germany.

An engineering society has been organized by members of the operating and designing departments of the Dominion Iron & Steel Co., Sydney, N. S.

## STEEL MAKERS CONFER

### Advances in Various Products Urged by Non-Integrated Companies

A meeting of manufacturers of iron and steel products was held at the Waldorf-Astoria, New York, Friday, March 1, under the auspices of the Committee on Steel and Steel Products of the American Iron and Steel Institute, to consider conditions in the trade and especially the price situation, with a view to making recommendations to the Government concerning the fixing of prices to prevail after March 31. About 75 were present and Judge Gary presided at the sessions in the morning and afternoon.

Opinions were exchanged fully and frankly, and although naturally views differed as to what prices should prevail, owing to the variance in costs of different companies, there was a strong sentiment in favor of stabilizing the market over a period of six to nine months. On account of the extremely cold weather and railroad congestion, the costs of operation in December, January and a considerable part of February were shown to have been very high, and several of the steel companies reported that their costs in December and January advanced at least \$6 per ton. Some of the larger manufacturers expressed the opinion that a continuance of present price schedules for six months or even a year would be satisfactory, but others strongly contended that on their products prices are too low and should be advanced. Especially in plates advances were held to be necessary, and the same position was taken as to wire products and other lighter forms of steel.

The consensus of opinion was that the demand for steel products in the general trade is extremely quiet. It was stated that some plants not engaged on war materials are operating at not more than 50 per cent of capacity owing to lack of business. The falling off in demand from some consuming lines was also commented upon. At the conclusion of the meeting Judge Gary gave out the following statement:

The General Committee on Steel and Steel Products of the American Iron and Steel Institute expects to be invited in the near future to appear before the War Industries Board at Washington to discuss prices for the various iron and steel products, commencing March 31, when the term for the present prices, as approved by the President, expires.

The meeting to-day of representatives of the various lines was held for the purpose of examining the cost sheets of manufacturers and for the discussion of the relative or differential prices heretofore in force in order intelligently to present to the War Industries Board the facts necessary to a determination of future prices.

After the presentation of facts and figures it was finally decided to place the claims of the manufacturers in the hands of the General Committee for submission to the War Industries Board in such a manner as the committee may determine.

In reference to a statement of inadequate compensation accorded engineering service, made in behalf of the American Association of Engineers in connection with the situation of Government operation of railroads, Prof. F. H. Newell, head of the civil engineering department of the University of Illinois, says that an investigation made by officers of the association shows that the average monthly salaries of engineers employed on American railroads is as follows: Draftsmen, \$90 per month; inspectors, \$90; instrument men, \$100; resident engineers, \$125; assistant engineers, \$125; division engineers, \$150. These rates, he said, are approximately those of ten years ago, when money could purchase nearly double what it can to-day.

Net earnings for the year ended Dec. 31, 1917, of the Empire Steel & Iron Co. were \$1,018,174. Gross income amounted to \$1,800,251. Dividends paid on the preferred stock were \$387,500, leaving a surplus of \$630,674 for the year.

## PERSONAL

H. A. Brassert, who has been connected with the United States Steel Corporation since its organization, has resigned his position as assistant general superintendent of the Illinois Steel Co. at South Chicago in order to devote himself to his personal interests. As vice-president of the Miami Metals Co. and subsidiary companies, he will have charge of their operations in the production of ferromanganese. He will also act as consulting engineer for Freyn & Co., engineers and contractors. Mr. Brassert will associate himself with Francis H. Hardy and Chester D. Tripp in the firm of Brassert, Hardy & Tripp, to act in a consulting capacity on commercial and operating problems in the iron and steel. He will remain in Chicago with offices in the People's Gas Building. Mr. Brassert was a member of the coke committee of the United States Steel Corporation, chairman of the blast furnace section of the iron and steel committee of the American Institute of Mining Engineers and a member of the American Iron and Steel Institute. He is the designer of the Brassert gas washer of which 58 are now in operation in this country. He will be succeeded as assistant general superintendent of South Works by George L. Danforth, Jr., who has heretofore been superintendent of steel production at South Works. Mr. Danforth's former position will be filled by J. I. Larimer, who has been assistant general superintendent of the Joliet Works of the Illinois Steel Co.

Uldric Thompson, formerly chief engineer of the International Steel & Ordnance Corporation, who until recently has been serving in an advisory capacity in equipping the new artillery ammunition assembling plant at Rock Island Arsenal, has opened an office at 120 Broadway, New York, under the firm name of Uldric Thompson, Jr., Inc., consulting and industrial engineer.

Lewis Searing, vice-president and general manager and practically executive head of the Denver Engineering Works Co., manufacturer of mining and milling machinery, has disposed of his half interest in this company to the Hardinge Conical Mill Co. with headquarters in New York City. He contemplates taking a few months' vacation before deciding on his future line of work. He is a graduate of Stevens Institute of Technology, specializing in electrical engineering, and began his career in Colorado as a consulting engineer.

J. S. Green, erecting engineer and master mechanic for the Wickwire Steel Co., Buffalo, has resigned to accept the position of master mechanic with the Edgewater Steel Co., Pittsburgh.

I. E. Edwards, for twelve years chief engineer, has been made works manager of the ingot mold foundry of the Marshall Foundry Co. at Josephine, Pa.

Howard S. Hart has retired as president of the Hart & Hutchinson Co., New Britain, Conn., taking the newly created office of chairman of the board. Norman P. Cooley also retires as treasurer, continuing on the board of directors. Maxwell S. Hart was promoted from vice-president to president and Loren E. Page, secretary, was elected vice-president and secretary. Donald R. Hart was chosen treasurer.

Arthur G. Kimball has been elected president of Landers, Frary & Clark, New Britain, Conn., succeeding Charles G. Smith, who becomes chairman of the board. Joseph F. Lamb was added to the board of directors.

George T. Kimball has been added to the board of directors of the American Hardware Corporation, New Britain, Conn.

A. B. Seelig, general manager Bristol Brass Co., Bristol, Conn., has been elected vice-president, succeeding N. Welch, resigned. Albert F. Rockwell has been re-elected president and J. R. Holley treasurer.

Daniel B. Gauchet, for some years production man-

ager, West Lynn, Mass., works of the General Electric Co., will become works manager, March 15, of the Remington Bridgeport Works of the Remington Arms Union Metallic Cartridge Co., Bridgeport, Conn.

F. H. Munkelt, who has been identified for some years with the Petroleum Iron Works Co., is now manager of the office in the Munsey Building, Washington, D. C., of the War Service Committee of the Steel Fabricators of the United States, the committee serving as a selling and distributing committee for structural steel and plate fabricating work for the Government.

John H. McIlvaine, for the past two years connected with the sales department of the Gary Screw & Bolt Co., Gary, Ind., has resigned to take a position with the Youngstown Pressed Steel Co., a subsidiary of the Sharon Steel Hoop Co.

M. H. Collins has been appointed sales manager of the new Louisville, Ky., branch of the Rensselaer Valve Co., Troy, N. Y.

John A. Camm, who recently severed his connection with the Cleveland Milling Machine Co., Cleveland, Ohio, of which he was vice president, has been appointed general sales manager of the Kearney & Trecker Co., Milwaukee, Wis., with which he was formerly associated.

Frank B. Foster, who formerly maintained offices in the Farmers Bank Bldg., Pittsburgh, as a dealer in iron and steel products for export, largely to Italy, has been appointed captain in the U. S. Army, and is now connected with the production section, Carriage Division, Sixth and B Streets, Washington. Captain Foster's business affairs will be taken care of by the Thomas R. Heyward Co., Farmers Bank Building, Pittsburgh, to whom inquiries should be addressed.

The American delegation to the conference on international standards of manufacturing materials for aircraft production has arrived in England. Among the members are: James Hartness, president Jones & Lamson Machine Co., Springfield, Vt.; Chas. M. Manly, vice president Manly Drive Co., New York, and consulting engineer Curtiss Aeroplane Co.; Albert L. Colby, consulting engineer, South Bethlehem, Pa.; Dr. W. F. Durand, Leland Stanford University and of the Aircraft Board; E. H. Ehrman, secretary and manager Chicago Screw Co., Chicago, and Coker Clarkson, general manager Society of Automotive Engineers.

Henry Johnson, formerly general manager of the Fairview Foundry Co., Detroit, is now in charge of the Theisen-Braithwaite Co., Port Huron, Mich., maker of gray iron castings.

J. E. Bolles, president J. E. Bolles Wire & Iron Works, Detroit, since it was formed in 1881, has been made chairman of the board of directors and has been succeeded by J. B. Mansfield as president and general manager.

R. A. Byrns, 120 Liberty Street, New York, has been appointed eastern representative for the Galland-Henning Mfg. Co., Milwaukee, Wis., manufacturer of Acme hydraulic scrap metal compresses and other hydraulic machinery.

H. P. Bope, vice president and general manager of sales of the Carnegie Steel Co., has been re-elected president of the Pittsburgh Radium Co., of Utah, which is controlled largely by Pittsburgh capital.

R. L. Hibbard, formerly assistant manager and gas engineer of the Riter-Conley Co., Pittsburgh, and connected with that concern for 15 years, has resigned, and he has opened an office in Room 8058 Jenkins Arcade Building, Pittsburgh, as general consulting engineer.

Fred T. Llewellyn, for 11 years engineer in the New York office of the Carnegie Steel Co., is now located temporarily in its Pittsburgh office, where he is looking after the interests of the Federal Shipbuilding Co., a subsidiary of the United States Steel Corporation.

Freyn & Co., engineers and contractors, Peoples Gas Building, Chicago, announce the election of Charles D. Rawstone as vice president of the company and Frederick H. Willcox as secretary. Mr. Rawstone has been with the company since February of last year, having



previously been connected with the George A. Fuller Co. Mr. Willcox has been with Freyn & Co. since September, 1917, having previously been connected with the Bureau of Mines. Prior thereto he was assistant blast furnace superintendent for the National Tube Co. After leaving the Massachusetts Institute of Technology, he went to the Carnegie Steel Co., Duquesne, Pa. His work with the Bureau of Mines was in connection with iron and steel metallurgy.

William A. Morgan, vice president and general manager Curtiss Aeroplane & Motor Corporation, Buffalo, has resigned his position on account of ill health, after having been in California since last October in an endeavor to recuperate. He retains his place in the directorate of the company. Shortly after the entry of the United States into the war, Mr. Morgan sold his interests in the Buffalo Copper & Brass Rolling Mill to the American Brass Co. and retired from business. Very soon thereafter, however, at the solicitation of John N. Willys, who had become president of the Curtiss company, he took a commission with that company as vice president and general manager, with the understanding that his salary be given to the Red Cross. Without waiting for formal action by the Government or contract, he financed and built the present big aeroplane plant at Elmwood Avenue and the Lackawanna Railroad, completing construction in 69 working days. His successor has not been appointed.

The Worthington Pump & Machinery Corporation, New York, announces the following appointments: James E. Sague, vice-president, in charge of engineering and manufacturing; Leon P. Feustman, vice-president, in charge of general commercial affairs, including contracts, prices, purchases, traffic, etc.; Frank H. Jones, vice-president, in charge of sales; William Goodman, assistant to vice-president; William Schwanhauser, chief engineer; Neil C. Lamont, works manager, Laidlaw Works, with office at works, Elmwood Place, Cincinnati; Edward T. Fishwick, general sales manager; Charles E. Wilson, assistant general sales manager.

Changes in the blast furnace department of the Bethlehem Steel Co. in Lebanon and Cornwall, Pa., have been made. John Haddow has been appointed furnace superintendent at North Lebanon. James E. Gledhill is manager of the North Lebanon plants. Harrison Prindle, who has been assistant superintendent, has been made superintendent of the Colebrook furnaces.

Edgar C. Felton, formerly president of the old Pennsylvania Steel Co., has been appointed Federal examiner for the Delaware Valley shipbuilding industry, including Baltimore.

J. B. Henry, general superintendent Union Steel Casting Co., has been made a vice-president, succeeding J. B. Allen, who was elected president. Mr. Henry will hereafter fill the duties of vice-president and general superintendent. Mr. Eichenlaub, secretary, has been appointed manager of sales.

Frank S. Reitzel has been made first vice-president of the Wright-Martin Aircraft Corporation, New Brunswick, N. J. For some years he was statistician and controller of the Pennsylvania Steel Co. at Steelton, Pa., and later held a like position with the American Iron & Steel Mfg. Co., Lebanon, Pa., until it was merged with the Bethlehem Steel Co.

B. F. McCreary, formerly in the sales department of the Republic Iron & Steel Co. and more recently in charge of sales for the Matlack Coal & Iron Corporation, New York, has joined the sales department of J. K. Larkin & Co., New York.

Paul R. Ketzer, formerly manager of the Ketzer Machinery Co., Philadelphia, has become manager of the machinery and engineering department of W. H. Robinson & Co., Real Estate Trust Building, Philadelphia, the Ketzer Machinery Co., having been consolidated with Robinson & Co. This new department will conduct an export and domestic business in machinery and allied lines.

## NEW WAR INDUSTRIES HEAD

### Bernard Baruch Appointed by the President—Larger Powers Expected

WASHINGTON, March 5.—President Wilson today announced the appointment of Bernard M. Baruch as chairman of the War Industries Board. The appointment carries with it a large measure of control of the country's industries. In making it the President sent a letter of instructions to Mr. Baruch outlining the functions, the constitution and action of the War Industries Board. The new method for organizing the nation's production, which is now in the hands of the board, is considered the most important step in co-ordination of administration which the President has taken since the United States entered the war. Should the Overman bill pass, it is expected that the President will confer on the War Industries Board even larger powers than those indicated in his letter to Mr. Baruch. Under that bill the office of chairman of the board would be practically an executive office.

In the determination of prices the President directs that the chairman shall be governed by the advice of a committee consisting, besides himself, of the members of the board immediately charged with the study of raw materials and of manufactured products, of the labor member of the board, of the chairman of the Federal Trade Commission, the chairman of the Tariff Commission and the Fuel Administrator.

### Judge Lovett in Charge of Railroad Betterment

In anticipation of the final passage of the Administration's railroad measure Director General McAdoo has decided to create two new divisions in his office to supervise the expenditures of the railroads while under Government control. Robert S. Lovett, former chairman of the Board of the Union Pacific and priorities director of the War Industries Board, has been appointed chief of the new Division of Betterments and Additions, while John Skelton Williams, at present Comptroller of the Currency, has been placed at the head of the Division of Finance and Purchases. Mr. Williams is working out a tentative plan for the centralization of purchases for all roads, which will ultimately take the place of their purchasing departments. This project is a departure from the director general's original plan, which was merely to supervise expenditures in a general way, leaving each system to do its own buying. It is understood, however, that the purchases made by the new division will include only the larger items of equipment and will not embrace less important supplies.

Judge Lovett will supervise the big program of extensions contemplated for this year, according to a semi-official announcement made here, and will give special attention to terminal construction. He will also determine what improvements are essential and what should be postponed until the close of the war.

Reports of railroads now being tabulated by the Interstate Commerce Commission and railroad administration officials show the improvements railroads had planned for this year if private operation had been continued. These reports are also being examined by a committee of railroad engineers, acting for Director General McAdoo, with a view of trimming the estimates in the light of emergency war needs.

Judge Lovett, who has resigned from the War Industries Board, is expected to form a national organization, including railroad vice-presidents in charge of improvements and extensions on their respective lines. Every proposed expenditure for these purposes will be closely scrutinized before being approved. The new division will work closely with the Division of Finance and Purchases.

The Holland Furnace Co., Holland, Mich., has increased its capital from \$650,000 to \$800,000.



## TOOL AND ALLOY STEELS

### Conditions of Supply and Demand—Review of Markets in Three Different Centers

Subjoined are reports of an investigation made in the New York, Chicago and Cleveland districts of conditions governing supply and demand of tool steel and alloy steels. Government necessities are the chief source of activity, and while supplies have been checked by fuel and transportation difficulties no manufacturing plants appear to be in any special distress owing to inadequate supplies of cutting tools or alloy steel materials.

#### CONDITIONS IN EASTERN MARKETS

The high-speed steel market is very active throughout the East. So far manufacturers have been able to meet demand, but it is a capacity market, now 1000 per cent greater than before the war, and growing as fast as the output of tool steel makers expands. Early shipment can be had on standard sizes, but a large consumer ordering a quantity of special size would probably have to wait six weeks for delivery. Manufacturers of high-speed steel exclusively find themselves in a better position than makers of both high-speed and carbon tool steels. The former have easily met demands so far, the latter not as easily, as the strongest demand is for the low-carbon tool steel, because of its comparative cheapness and serviceability for a wide range of shop work. The supply of steels for taps, dies, twist drills, reamers, etc., has always been ample.

#### Checks Due to the Fuel Crises

Large steel companies which are producers of both tool and alloy steels and whose plants have a varied output of special alloy steel rollings and forgings most urgently needed for war machinery have been severely put to it through the disastrous traffic and fuel crises to maintain operations and supply these most essential war requirements. Those mills in Western Pennsylvania, which in some cases had a fair amount of coal for power and used natural gas or more particularly electricity in their furnaces, fared better than in other districts, notably along tidewater. At the present time tool-steel makers burning fuel oil are facing trying times. In order to rush supplies abroad the Government has lately commandeered most of this output, and in one case seized the tank fleet of an oil company which supplies one of the largest of such steel companies, a corporation whose work is 99 per cent class A war work. It has been forced by this action to go out into the open market and job for its supplies. For a time recently it faced a shut-down on this account.

Crucible steel output is reported months behind on orders and the prospect is poor, as suitable crucible materials cannot be had in sufficient quantities. Plumbago, available now in unlimited supply in Ceylon, cannot be got to this country except by intermittent shipments. Moreover, the special German clays of which they were formerly molded have so far been replaced by American clays with only partial success. Crucibles consequently now cost three times what they did before the war, and give but one-third the service.

#### Labor and Priority Dislocations

The plants, especially the smaller well-known tool steel mills in and about the Pittsburgh district, have had no trouble in keeping their skilled labor and have maintained their forces of unskilled workmen without more than the average trouble. Some mills at tidewater, however, unfortunately situated near shipyards, are losing their men by squads with little prospect of replacing them, as the inducement is two dollars for every one they have been making, and shorter hours. So depleted are these particular mills by this exodus of labor that they are put to it to keep the floors cleared away around the mills. Rolling and forging, and running the product into the warehouse are about

all that can be accomplished in these places.

Outside the pickets at some of these tidewater mills in the New York district, shipping agents from large munition plants sit on the curbstone or stand around awaiting word of this or that tool or alloy steel upon which the completion of some vital war products depend, with no assurance that the men are at hand to load it even if it is out of the mill.

Confusion in priority rulings has been adding to the difficulties of mill operations and shipment. First one Government department or army corps and then another secures priority and comes armed with an order for delivery of materials. The net result is that there is no amount of priority of one kind of essential work over another, non-essential buying alone being stopped.

The needs for special alloy steels in the East are principally chrome-nickel for ball and other bearing steel, airplane engine frames and parts, and for certain shipbuilding work. It is entirely a Government market, not active, and moreover is limited by the universal hindrances surrounding rail shipments. There are, in fact, restrictions even on shipments to consignees doing Government work.

#### Great Demand for Cutting Tools

Large users of tool steels are kept busy maintaining their proper stock of cutting tools, and drastic measures have been taken by the Government to equip some of the big war plants that have been created in the Middle West without previous arrangement for their requirements in cutting tools. In one case a recent Government order preempted all stocks of a certain size in a dozen Eastern warehouses. The next day these same warehouses were frantically wiring each other for small lots of this size to meet the needs of their regular trade.

So great has the demand for cutting tools, taps and dies become with the munition makers that some of them, such as Remington, Winchester, Eddystone and Baldwin, have found their own tool-making departments—factories in themselves—entirely inadequate, and have taken the entire output of many of the tool-makers maintaining small plants, in particular the numerous shops occupying lofts in large cities. In some cases they gladly put up the cash for tool steel to apply on their own orders.

#### The Export Trade in Tool Steel

The export trade in high-speed steels, except to Canada, is held in abeyance by the recent Government restrictions. England has supplied her own and France's needs since the start of the war, and also Italy's, largely. Recently some ferrotungsten has been ordered from this country for Italian account. The inspired demand from Scandinavian countries for high-speed steels shortly after the war started, has of course disappeared. A smaller demand from Switzerland has also dropped off. A few orders are still received from Spain and South America offering big premiums which cannot be taken advantage of. Shipments to Canada are heavy. Export regulations now require separate detailed declarations for each shipment instead of the blanket permit accepted until lately. Some shippers have had great trouble in getting the printed forms from Washington. On the other hand, other companies have no such trouble, and it is probably a matter of but a short time when shipments will go through to Canada in routine fashion.

#### TOOL AND ALLOYS STEELS IN CHICAGO DISTRICT

Purchasing by the Government and munitions manufacturers is the principal factor responsible for the active market in high-speed tool steel now existing in the Chicago territory. In material of this kind, of course, the aggregate tonnage is small, but values run high. The chief local purchaser for Government consumption is the Rock Island Arsenal, with munitions makers like the Minneapolis Steel & Machinery Co. also notable buyers. In the opinion of a jobbing house, the action of the Government, in fixing a base price, for mill shipment, of \$2 per lb. on high-speed steel had

a salutary effect, as it relieved of uncertainty the minds of general buyers and they have been purchasing more freely since the price was fixed. Ordinarily, many such consumers do not buy until they are compelled, and then they buy as little as possible. The active demand for high-speed drills has caused the makers of these to buy more heavily than usual of the raw material. The merits of standard brands are generally recognized, and it is not uncommon for intending purchasers to specify steel that is equivalent to a named product, the reliability of which has been ascertained by actual cutting tests. Prior to the war high-speed steel of good grade was as low as 60c. per lb. Later, because of the high price of tungsten, the price mounted as high as \$3.50. As stated, the mill price is now \$2, base, and that from maker's warehouse stocks \$2.01 per lb. Tungsten finishing steel is officially priced at 65c. per lb., mill shipment, and 66c. from warehouse. The base prices are subject to established trade customs, for sizes, etc.

Carbon tool steel is not so active around Chicago as high-speed, but of this, also, the Government is a buyer, and the demand is described as "decent." Subject to established customs of trade, official prices have been named, as already published, shipments from makers' warehouses commanding 1c. extra.

#### Chrome Steel Reserved for Government

The demand for alloy steels such as nickel and chrome nickel, etc., is brisk, the mills are behind in deliveries, and one large jobber reports stocks well thinned out. The call for electric furnace steel has greatly increased since the beginning of the war and one large manufacturer has sold its production for the first half. Steel containing nickel, chrome and some other alloys are much used in the manufacture of forgings for guns and motor trucks. Practically all of the chrome and chrome nickel steel is going, directly or indirectly, to satisfy Government requirements, the scarcity of chromium having made it necessary to conserve that element for Governmental purposes. The makers of pleasure automobiles are not so active as formerly. Soldiers' helmets are formed of manganese or chrome steel, and it is interesting to observe that while a chrome steel helmet is dented by a bullet fired from a rifle at close range, the bullet suffers the greater damage, often buckling up like an accordion. The Government, among numerous other uses, is using nickel steel in making stirrups and bits for horses. It has not fixed prices on alloy steels and, according to local makers, there is no general quotation, costs depending on specifications and the percentages of chrome, nickel, etc., used.

#### Uses Steadily Expanding

The wider use of alloy steels is forecast by the steadily growing demand for minimum weight coupled with maximum strength. In the tractors of a very few years ago—the first built—a great deal of cast iron was used. Now, where cast iron was used is found malleable iron or alloy steel. The agricultural makers generally are using more high-grade material, one reason for this being that the tractor drawn or propelled implement must have great strength to withstand the strains to which it is subjected. The practice of having scientific analysis made of materials is steadily expanding.

In connection with high-speed steels it may be observed that many manufacturers no longer adhere to the opinion that they must have soft castings, as the cutting qualities of high-speed steel make it possible to machine material three times as hard as that formerly used. Incidentally the use of the harder castings is oftentimes an economy.

#### DEMAND IN CLEVELAND TERRITORY

The demand for tool and alloy steels in the Cleveland territory is heavy, and it is estimated that 80 per cent of the product is being taken directly by the Government or indirectly to do Government work. De-

liveries of both alloy and tool steels can be made in two or three weeks, providing mills can secure transportation facilities. Warehouse stocks of tool steel are fairly good, and production is apparently keeping up to the demand. Warehouse business is good and heavy in high-speed tool steel in lots of 1000 to 2000 lb. One contract for 100 tons of carbon tool steel is noted for delivery over a period of two months.

The demand for alloy steels for rear axles, steering knuckles, and roller bearings of motor trucks for the Government, and also for airplane work, is very heavy. Nearly all of the alloy steel contracted for several months ago for automobile work has been diverted to Government work by the buyers who have since taken on Government orders. One of these contracts calls for 1000 tons of chrome-silico-manganese spring steel, which was diverted a few days ago for use in motor truck work. A large amount of chrome vanadium steel is being used for making piercers for piercing out shells. A Cleveland shell plant has taken in the last few weeks two express shipments, each of a carload for this purpose, and secured a third shipment of nearly a carload by express a few days ago.

### Ordnance Base in France to Cost \$25,000,000

WASHINGTON, March 5.—An ordnance base that will cost approximately \$25,000,000 is under construction in France and good progress in building is reported, according to an official announcement by the War Department. There will be approximately 20 large storehouses, 12 shop buildings, 100 smaller shops and magazines and machine tool equipment costing about \$5,000,000.

The project includes a gun repair plant equipped to reline more than 800 field guns a month; a carriage repair plant of large capacity; a motor vehicle repair plant, capable of overhauling more than 1200 vehicles per month; a small arms repair plant with a capacity for repair of some 58,000 small arms and machine guns per month; a large shop for the repair of horse and infantry equipment, and a reloading plant capable of reloading about 100,000 artillery cartridge cases per day. There will be in addition forges, carpenter shops and other auxiliary buildings.

Much of the construction material and equipment has arrived in France and actual construction was begun several weeks ago. Practically all of the essential materials have been contracted for and priority orders issued by the War Industries Board have expedited deliveries.

It is estimated that for the maintenance of the ordnance base approximately 450 officers and 16,000 men will be required. Some difficulty was experienced in obtaining the initial units trained in manufacturing industries. When it was found impracticable to obtain enlisted men in large numbers and of the required qualifications from the selective draft army, a recruiting campaign was instituted by the ordnance base division and by the first of the year 8000 men had been enlisted for this special work. The training of technical troops for service with the ordnance base has proceeded satisfactorily and both from the recruited forces and the selective draft personnel men will be obtained to operate the immense ordnance base on foreign soil.

#### For Rapid Annealing of High-Speed Steel

A South German firm is reported to have discovered a new process by which high-speed and other steels can be annealed in two hours. Licenses for applying the method are to be given free of charge to military plants. Prof. K. Fischer of the Technical High School at Munich describes the process as a "considerable advance," as it certainly would be in economy of fuel and of skilled labor, if the claim can be borne out. No particulars are given.



### Wages of Puddlers Again Advanced

The bi-monthly wage settlement between representatives of the Western Bar Iron Association and the Amalgamated Association was held in Youngstown, Ohio, on Saturday, March 2. It was found that the average price on shipments of iron bars in January and February was 3.10c. per lb. at mill, an advance of 0.15c. over the average price for November and December, and entitling puddlers to a rate of \$15.05 per ton for March and April, as against \$14.30 for January and February. Finishers in bar iron mills will receive an average advance of 7½ per cent in wages for March and April over January and February. Puddlers and finishers are receiving now and have been for many months very much the highest rates of wage ever known in the bar iron trade.

A. M. Byers Co., Pittsburgh, which has a large puddling plant at Girard, Ohio, and the Youngstown sheet & tube Co., which operates a puddling plant at East Youngstown, Ohio, do not sign the Amalgamated Association scale. But both concerns have always paid the Amalgamated rate and will give their puddlers and finishers for March and April the advance in wages for puddling and finishing noted above.

The settlement of the sheet and tin plate scale will be made in Youngstown in the next week and sheet and tin plate mill hands will likely get an advance in wages for March and April over the rates that prevailed in January and February.

### Machinists' Wage Advances

In the early part of February the machinists' union of Bridgeport, Conn., voted to establish a new minimum wage rate of 85c. an hour to go into effect Feb. 15, with a rate of \$1 an hour to be established May 1. The anticipated advance did not go into effect, as the manufacturers took the matter up with Government officials and the matter is still pending adjustment.

In Worcester, Mass., trouble is threatened with one employer who discharged the president of the local machinists' union. The Government has notified the machinists that an investigator will be sent to look into the matter and the men are remaining at work until this official has an opportunity to make his report.

Machinists employed at the Watertown Arsenal, Watertown, Mass., petitioned the commanding officer, Feb. 25, for an increase of 60 per cent in wages and the abolition of the so-called Taylor efficiency system and the piece work method. These employees were given an increase in wages last September.

### Foreign Trade in January

An increase of \$7,000,000 in imports but a decline of \$80,000,000 in exports are recorded in the official figures for the foreign trade of the United States in January as compared with December. Imports aggregated \$234,704,109, as against \$241,793,282 in January, 1917, and \$184,350,942 for the same month in 1916. Exports in January were valued at \$504,823,303, as compared with \$613,324,582 for the same month of 1917 and \$330,036,416 in January, 1916. The balance of trade in favor of the United States in January amounted, therefore, to \$270,119,194, as compared with \$371,531,300 in the corresponding month of 1917.

The imports for the seven months of the fiscal year ended with January were valued at \$1,634,000,000, as against \$1,348,000,000 for the corresponding period of the previous year. Exports for the seven-month period totaled \$3,448,000,000, as compared with \$3,616,000,000 for a similar period the year previous. The favorable trade balance for the seven months ended January, 1918, is therefore \$1,813,169,148, as compared with \$2,267,013,159 for the corresponding period of 1917.

The Ingersoll-Rand Co., Phillipsburg, N. J., has announced that a bonus of 10 per cent will be added to the wages of all employees not losing more than 4 hr. time in each month, the new system to become effective March 1. About 4000 men in the Easton, Pa., and Phillipsburg plants are affected.

### License Concessions to Exporters

WASHINGTON, March 5.—Emergency conditions growing out of the recent extension of license control to exports of all kinds have made it necessary for the War Trade Board to come to the relief of shippers with concessions designed to meet the existing condition of congestion at seaport terminals of the leading railroad systems. Pursuant to the President's proclamation of Feb. 14, the War Trade Board announced that collectors of customs would accept shippers' export declarations in lieu of individual licenses for all goods which had not hitherto required licenses, when it could be shown to the satisfaction of the collectors that the goods were covered by either a bill of lading marked "for export" or a through export bill of lading, provided the bill of lading was dated Feb. 19, 1918, or earlier, and further, that the goods were actually exported by March 15, 1918. It has now been brought to the attention of the board that there is now a considerable congestion of freight at various ports which will make it impossible for all goods covered by the above ruling to be exported on or before March 15, 1918. To take care of the situation, the board has adopted a simple form of procedure to be used in those cases where the goods are covered by either a bill of lading marked "for export" or a through bill of lading dated Feb. 19, 1918, or earlier, and did not need a license prior to the President's proclamation of Feb. 14, 1918.

Any exporter or shipper who may be interested in shipments of this character which are not exported by March 15, 1918, should present his export declarations in quadruplicate, using form Customs Catalogue No. 7525, to the nearest branch office of the War Trade Board, and this branch office will license such shipments on the export declaration, without requiring the shipper or exporter to file a formal application. These export declarations, when licensed, will be of use only if the goods are actually exported by April 15, 1918.

### Government Control of Platinum

The production, refining, distribution, and use of crude and refined platinum has passed under the control of the Government for the period of the war by virtue of an order of the Secretary of War embodied in Ordnance Requisition No. 510. The control will be exercised through the chemical division of the War Industries Board which has sent out to the industry requests for inventories of the existing stock of crude and refined platinum and platinum-iridium alloys as of March 1, 1918. The board states that it is not the intention of the Government to take over and handle directly the present stock of platinum but to permit its shipment by the producers or dealers subject to certain conditions. Upon the fixing by the Secretary of War of a reasonable price for crude, refined, and alloyed platinum, notice will be given and blanks issued governing delivery and distribution. In general the order of preference to be followed in releasing platinum for shipment is: First, military needs of the United States Government; second, military needs of Allied governments; third, essential commercial purposes.

The Truscon Steel Co., Youngstown, Ohio, formerly the Trussed Concrete Steel Co., reports a total surplus of \$2,601,194 as of Dec. 31, 1917, of which more than \$1,000,000 was added from the past year's earnings after allowing for depreciation and current requirements and paying 18 per cent dividend on outstanding common stock and 7 per cent on the preferred stock. Preferred stock outstanding amounts to \$1,498,070 and common stock \$1,443,030.

The Cleveland Brass & Copper Mills, Inc., Cleveland, at the annual stockholders meeting last week re-elected its board of directors and appointed the following officers for 1918: H. C. Osborn, president; B. F. Brusstar, vice-president and general manager; B. M. Gardner, secretary and sales manager; H. P. McIntosh, Jr., treasurer.



## REPUBLIC EARNINGS LARGE

**Statement for 1917 Shows a Net Gain of \$11,785,083 Over 1916**

The Republic Iron & Steel Co.'s net earnings in 1917 were \$28,329,718, a gain of \$11,785,083 over the preceding year, according to the annual report issued Tuesday by John A. Topping, chairman of the board of directors. The statement was the best ever issued by the company. After setting aside \$9,878,657 to cover excess profits, taxes and other contingent charges and writing off nearly \$1,000,000 more for depreciation and plant renewal than in 1916, a balance of \$16,616,531 remained, of which \$14,007,197 is available for dividends on the common stock. The gross volume of business in 1917 was \$78,325,461, compared with \$52,844,017 in 1916.

The production of semi-finished and finished steel was 1,109,829 tons, a decline of 106,887 from the 1916 record. The iron mines owned by the company turned out 1,706,555 gross tons of ore, compared with 1,693,450 tons the year before, and the pig iron production amounted to 1,062,657 against 1,117,697 tons in 1916. Orders on the books as of Dec. 31 were for 318,324 tons of steel, compared with 617,950 tons the year before, and 100,619 tons of pig iron, compared with 183,026 on Dec. 31, 1916.

Chairman Topping, in his statement to the board of directors, said:

"The general conditions affecting the iron and steel markets noted in the annual report dated Dec. 31, 1916, extended through the year 1917, with demand emphasized by our country's war program, also by increased demand from the allied countries and other sources. This situation called for iron and steel in quantities so much in excess of supply that market values became abnormal, raw materials and supplies were similarly affected and wages advanced correspondingly. These abnormal conditions reached a climax during September, 1917, at which time Government regulation of iron and steel prices was established, followed by radical price reductions, which action necessarily reduced the profits of manufacture.

"To insure adequate fuel supplies, substantial increases to our coal mining capacity were made during the year, through the acquisition of property referred to hereafter, and also substantial additions were made to manufacturing capacity, the combined amount of these additions aggregating \$7,277,464.17. There was also set aside from earnings \$7,500,000 for new construction (of which amount \$6,358,265.40 is temporarily invested in Government bonds) and \$2,341,000 of our first mortgage 5 per cent gold bonds were purchased for redemption. These appropriations, while large, were advisable to strengthen operations; sufficient cash assets, however, are in reserve to fully satisfy all future requirements, the balance of net working assets as of Dec. 31, 1917, being \$25,945,536.28, and the undivided surplus account as of Dec. 31, 1917, after adding the net surplus for the year of \$12,475,736.85, totals \$30,711,988.28.

"As a result of the abnormal conditions prevailing and owing to the general demand for labor in all industrial districts two voluntary advances of 10 per cent each were made in labor rates by this company. The present general rate for unskilled labor under this company's schedule is now 33 cents an hour. As one of these advances was made in May and the other in October, they are not fully reflected in the statistics given. Another influence affecting labor conditions was the enlistment of employees of the company in the army and navy of the United States, the total number of such enlistments having been 698 men up to and including Dec. 31, 1917. These figures do not take into account a substantial number of employees who are serving the Government in various executive, clerical, engineering and other capacities. There has necessarily been a decrease in efficiency and increased cost of operation to the company by the loss of the service of experienced employees and their replacement by inexperienced men. A comparison of the amount paid

for labor from 1915 to 1917 shows the cumulative effect of the wage increases over a period of two years; in the number of employees tabulated no account has been taken of the men employed in the coal mining property recently purchased."

## Annual Dinner of Bridgeport Manufacturers

The Manufacturers' Association of Bridgeport held its tenth annual dinner at the Hotel Stratfield, Bridgeport, Conn., Feb. 26. Its president, Charles E. Bilton, Bilton Machine Tool Co., acted as toastmaster and introduced Governor M. H. Holcomb of Connecticut, who emphasized the importance of the part his State is taking in the war program. Mayor Wilson of Bridgeport, who is also lieutenant-governor of the State, followed with an address of welcome to the 433 business men in his audience. Col. Samuel McRoberts, head of the procurement section of the Ordnance Department at Washington, interested his hearers greatly with a recounting of the exact status of the work of the Ordnance Department as so far developed and by an outline of the organization which is now carrying out the work of securing fighting material for our army. He gave many figures regarding existing contracts and the rate at which they are being filled—an exhibit which filled every man present with new optimism for the American cause. Senator James E. Watson of Indiana pointed out that we are fighting all Germany, and not merely its ruling class, because the entire nation thinks as one. At the end of a decidedly patriotic address he devoted some time to the fear many have that we are drifting toward autocracy, and expressed the belief that it was wise now to give large powers to the President but that they must be limited to the war period. Another speaker was Prof. Francis H. Green, West Chester, Pa.

## Economic Combination Against German Trade

WASHINGTON, March 5.—By the overwhelming vote of 1204 to 154 the business organizations throughout the country affiliated with the United States Chamber of Commerce have adopted a resolution looking to the formation of an economic combination against German trade after the war unless the danger of excessive armament is removed by making the German Government a responsible instrument controlled by the people. The vote was taken in the course of a referendum sent out on Jan. 12 to each one of the thousand local chambers and other industrial and commercial organizations that comprise the National Chamber. The business men of Germany are asked to study the situation and to co-operate to the end that a disastrous economic war may be averted and that a lasting peace may be made more certain. This expression of the views of the business men of the United States is regarded as highly representative inasmuch as no organization, no matter how large, has been permitted to cast more than ten votes and every state in the Union is represented in the referendum.

## Wants Building Industry to Prosper

The National Association of Ornamental Iron and Bronze Manufacturers has adopted a resolution petitioning the Government to make no unnecessary restrictions upon the building industry and to make public announcement of its policy relative to such restrictions. The resolution says: "We believe that the disorganization of any industry and enforced idleness of workmen will be infinitely more harmful to the nation than the benefits that, under the most favorable circumstances, could be attained by the Government in securing inconceivable results for favored industries at the expense of others discriminated against."

The Automotive Engineering Corporation, Buffalo, has been incorporated with a capital stock of \$125,000 to manufacture carburetors, motors and engines. H. R. H. Richards, E. McM. Mills and M. C. Spratt, Fidelity Trust Building, are the incorporators.

## New Iron and Steel Institute Members

The following were elected on March 2 to membership in the American Iron and Steel Institute:

- Active grade:  
 D. E. Armstrong, secretary Wm. Kennedy & Sons, Ltd., Collingwood, Ont.  
 Walter W. Leck, Bethlehem Steel Co., Steelton, Pa.  
 Elmer C. Sattley, Page Steel & Wire Co., Pittsburgh.  
 Rudolph Tencher, Keystone Steel & Wire Co., Peoria, Ill.  
 William M. Tobias, Bethlehem Steel Co., South Bethlehem, Pa.  
 Stillman W. Wheelock, Carnegie Steel Co., New Orleans, La.  
 Associate grade:  
 Clarence L. Altemus, Pacific Commercial Co., 11 Broadway, New York.  
 Charles A. Barnes, chief Bureau of Iron and Steel Scrap, Philadelphia.  
 Francis John Burd, Cutler-Hammer Mfg. Co., Pittsburgh.  
 W. Rowland Cox, 120 Broadway, New York.  
 Charles Dreifus, Pittsburgh.  
 James F. Foster, vice-president Republic Metalware Co., Buffalo.  
 J. H. France, General Refractories Co., 111 Broadway, New York.  
 David M. Griffith, Wilputte Coke Oven Corporation, 6 Church St., New York.  
 Roy G. Hird, Republic Metalware Co., Buffalo.  
 Albert L. Johnson, vice-president Corrugated Bar Co., Buffalo.  
 Maurice Joseph, vice-president Ohio Falls Iron Co., Cincinnati.  
 Henry J. Klaer, vice-president Penn Seaboard Steel Corporation, Philadelphia.  
 Harold A. Lomax, Mackintosh, Hemphill & Co., Pittsburgh.  
 John F. Lucey, president Lucey Mfg. Corporation, Woolworth Building, New York.  
 W. H. Pavitt, Wilputte Coke Oven Corporation, 6 Church Street, New York.  
 Ernest Suffern, 96 Wall Street, New York.  
 George R. Sullivan, Rogers, Brown & Co., Philadelphia

## Trade Schools Course for Conscripted Men

A war emergency course to train conscripted men for machine-shop occupations, blacksmithing, sheet-metal working and pipe fitting has been prepared by the Federal Board for Vocational Education, and will be distributed to the schools throughout the country as soon as it can be printed. It is known as bulletin No. 8.

"There is a critical and constantly growing need for many thousands of mechanics and technicians for army occupations carried on in and behind the lines of the United States Army," declares the Board. "Many of these workers, already experienced in similar occupations of civil life, will be secured through the draft and possibly through voluntary enlistment. It is recognized by those in a position to know that the quotas thus obtained will not be sufficient, and that it will be necessary to give special training to many thousands of men for various occupations and in various ways. The War Department has taken definite steps to provide for this training systematically through army schools, and in some instances at cantonments, but largely at the industrial, trade and engineering schools of the country."

The Federal Board of Vocational Education is acting for the War Department in preparing these courses of study and in dealing with the State authorities in charge of the school work. Men who take these courses, it is declared, "should not be led to believe that they are learning a trade. They are serving their country by learning to do a special job well, though to some extent this training may be beneficial to them in after life."

Vincenzo Ferrari, importer, Piazza de Ferrari, Palazzo Nuova Borsa, Genoa, Italy, wishes to deal direct with American manufacturers and producers of metals, foundry supplies and raw materials. Correspondence may be in Italian, Spanish or French, preferably Italian. The National City Bank of New York is given as reference.

## Pig Iron from Electric Furnaces

Progress in the production of pig iron from the ore in the electric furnace has apparently been small, though the high prices for iron and steel might have been expected to have acted as a stimulus to this phase of the steel industry.

From *Jern-Kontorets Annaler*, the official publication of the Institute of Swedish Ironmasters, the London *Ironmonger* has summarized data prepared by J. A. Leffler dealing with the erection of electric furnaces for producing pig iron in the north of Sweden. The proposal involved four plants with six furnaces in all to produce 65,000 to 70,000 tons of pig iron per year, using 110,000 to 120,000 tons of ore and about 25,000 tons of charcoal. It was assumed that to produce 1 ton of pig iron from the Luleå or Gellivare ores would require 1.6 tons of ore, 0.4 ton of charcoal, and 0.272 kw.-yr. of electric current. This exceptionally low current consumption is based on the continuous working of the plant. In spite of these favorable conditions, however, the detailed estimates given of the cost of electric pig iron show that it cannot compete commercially with the product of the blast furnace.

It may be recalled that as far back as 1906 the Canadian Government started experiments in electric smelting of iron, and the subsequent report showed that 4 tons of pig iron could be produced per horsepower-year, equal to about 1650 kw.-hr. for the 4 tons. This compares very favorably with current Swedish practice with large furnaces in which 2500 to 3000 kw.-hr. are consumed in the production of a gross ton of iron.

The shaft furnaces used in Sweden would seem to be needlessly complicated and expensive, as compared with the ordinary electric smelting furnace properly designed with automatic charging from overhead hoppers. Although no further extensions of electric smelting have taken place on the lines of Swedish practice, it is surprising that the results of the Canadian experiments have not been industrially applied under present conditions. Probably the outstanding difficulty is the shortage of power.

Electric pig iron produced from shell turnings and scrap, instead of from ore, is, however, an interesting war development. Owing to the relatively low initial cost of plant and the low power consumption, this process seems likely to come into greater use. Any modern type electric furnace can be used.

## Plan to Combat Plant Fires and Sabotage

An appeal has been issued by the New Jersey Committee of '76 to industrial workers to organize a Patriotic Civic Corps for the purpose of forestalling incendiary fires and sabotage of enemy plotters. Its recommendation includes the formation of a patriotic guild auxiliary in factories and the following program: 1. Circulation through the pay envelope of a pledge, in printed form, for enrollment in this cause; 2. appointment of one plant official as a plant-protection officer to card index all workers; 3. to elect two lieutenants, two second lieutenants, eight sergeants and eight corporals, to officer this company and assign specific duty to squads of four or eight men, including hose, hook and ladder, chemical engine and hand-grenade, fire pail and sprinkler, salvage, axe and tool, police and safety patrol squads; 4. to carry on a day and night patrol on a semi-military basis; 5. to detect and report various forms of sabotage, such as dropping injurious matter into machinery, turning out defective products, seditious talk, unruliness, fostering of racial prejudice, enemy propaganda, unpatriotic language, idleness, carelessness and negligence which might result in fire. Further information is obtainable from Major J. E. Bloom, U. S. A., ret., 201 Essex Building, Newark, N. J.

To help win the war the mechanics of the Oaklawn shops of the Chicago & Eastern Illinois Railroad, Danville, Ill., have agreed to work 10 hr. per day, seven days a week until its locomotives and cars are in first-class condition.



## Proposed National Trademark

WASHINGTON, March 5.—A far-reaching project to provide a National trademark for American goods manufactured and sold in this country or exported in accordance with regulations prescribed by the Secretary of Commerce is embodied in a measure which has just been introduced in the House by Representative Sims of Tennessee, chairman of the Committee on Interstate and Foreign Commerce. The bill is understood to have been framed in the Department of Commerce and is designed to induce manufacturers, especially those making goods for export, to comply with certain requirements as to kind, quality, dimensions, method of packing, etc., as conditions of being permitted to use the proposed trademark. There would be nothing compulsory about the arrangement, but the framers of the bill assert that a trademark acquired under such conditions and used subject to constant Governmental supervision would have an enormous value and would give the goods sold under it a notable prestige at home and in every market of the world.

The bill authorizes the Secretary of Commerce to adopt an emblem or token to be known as the "National trademark." The trademark thus selected would be registered in the Patent Office without limitation as to time and the Secretary of Commerce would also be authorized to register it in all desired foreign countries.

The Secretary of Commerce, upon application to him by any manufacturer or producer in the United States, will be authorized to issue a license to use the trademark in question. Full powers are granted to the Secretary of Commerce to make such rules and regulations "as he may deem necessary for the effective enforcement" of the law, a provision the importance of which can not be overestimated, as it would put in the hands of the head of a single executive department of the Government the authority to prescribe the conditions under which a very large part of the export trade of the country would be conducted, assuming that manufacturers generally would avail themselves of the opportunity to use the proposed trademark.

## Shenango Ore Book

The Shenango Furnace Co. (W. P. Snyder & Co.), Pittsburgh, recently issued the annual book of analyses of its Lake Superior Bessemer, non-Bessemer and silicious iron ores. Its iron ore properties consist of the Shenango mine, Tioga mine and South Tener mine all at Chisholm, Minn., Webb mine at Hibbing, Minn., Whiteside mine at Buhl, Minn., and Clifford mine at Iron Mountain, Mich. Of the company's three lake freighters, the W. P. Snyder, Jr., has a record of bringing down in one trip 13,694 gross tons of ore, while the Col. James M. Schoonmaker has hauled 13,558 tons. These two steamers are the largest of bulk freighters, being 617-ft. long and 64-ft. beam. Besides the analyses of ores from the mines named above the booklet gives data of the trip capacity of lake freighters for the season of 1917. There were 398 ore vessels in the service, with a total capacity per trip of 3,113,200 gross tons. Another table shows yearly prices on Lake Superior iron ore for the years 1900 to 1918 inclusive. Other data relate to analyses of ores, lake freights on ore, rail charges, analyses of Shenango pig irons, a table of pig-iron outputs from 1900 to 1917 by grades, and one showing average prices on Bessemer and basic iron for the years 1907 to 1917 inclusive.

A new acid-proof alloy is reported to have been created by a Frenchman, Professor Borcheres, of Aix-la-Chapelle, France. It is made by adding from 2 per cent to 5 per cent of molybdenum to an alloy of iron and chromium and little or no carbon. An alloy of 35 per cent iron, 60 per cent chromium and a little molybdenum is insoluble in boiling aqua regia; it has the same strength as cast iron and can be worked in the same way. An addition of titanium or vanadium is said to produce effects resembling those obtained from molybdenum but in a less degree.

## Pittsburgh and Nearby Districts

The Pittsburgh Testing Laboratory has turned over to the United States Government for the duration of the war its plant in Pittsburgh, with full equipment of chemical, physical and analytical laboratories; also scientific inspection laboratory for testing cement, and apparatus for inspecting and testing steel. George H. Clapp, president of the company, said this had been done purely through the desire to aid the Government and that his company would find some other location where it could take care of private patrons till the Government should be able to return the plant to its owners. Some of the company's employees already have been engaged by the Government, and it is expected others will be transferred. The Pittsburgh Testing Laboratory was organized 35 years ago.

The Equitable Gas Co., Pittsburgh, has sent out notices to its manufacturing consumers that it has found it necessary to curtail and eventually to cease furnishing natural gas for manufacturing purposes in large quantities. The company will withdraw its general industrial rates on April 1, but will continue to furnish gas under certain contracts until such contracts expire. The company says that in spite of a very extensive drilling program to be carried out this year, it will require all the natural gas it can possibly furnish for its industrial consumers that have long term contracts and also for domestic users.

Manufacturers in the Pittsburgh district generating their own power will not be restricted in the future in taking on additional Government orders. Announcement to this effect has been made by Robert Garland, president of the Chamber of Commerce of Pittsburgh, and D. O. Holbrook of the Federal Natural Gas Administration on his return from Washington. Instructions were issued from Washington last December that no further war orders would be placed in the Pittsburgh or Niagara Falls districts except with the approval of the War Industries Board because of the shortage of power.

The Independent Bridge Co., Pittsburgh, in a complaint against the Pennsylvania Railroad before the Interstate Commerce Commission, asks that the rate of 4.2c. per 100 lb. on cast iron annealing boxes, Allegheny, Pa., to Weirton, W. Va., be applicable to wrought-iron annealing boxes. The bridge company contends that the present rate of 7.9c. on wrought iron boxes is excessive, and says that in charging \$326.55 on a consignment to the Phillips Sheet & Tin Plate Co., Weirton, the Pennsylvania was unreasonable. It is averred the total charge should not have exceeded \$173.62.

The Trussed Concrete Steel Co., Youngstown, Ohio, has changed its name to the TrusCon Steel Co., and at its annual meeting held in Detroit last week, officers were elected as follows: Julius Kahn, president; Joseph Boyer, vice-president; T. H. Kane, second vice-president; Day Krolik, treasurer; Ralph M. Dyar, secretary; O. W. Chaffee, assistant treasurer; E. W. McDonald, comptroller and assistant secretary. The company is building an addition to its plant at Youngstown to cost about \$200,000 for which considerable new equipment will be needed.

The Pittsburgh Export Co., and the Liberty Steel Products Co., main offices in the Farmers Bank Building, Pittsburgh, have opened branch offices in Room 604, Stambaugh Building, Youngstown, Ohio. A. M. Dillon, formerly assistant sales manager of the Youngstown Sheet & Tube Co., is president of the first named concern, and a director in the latter. Both concerns are engaged in exporting iron and steel products, machinery and building materials. They are also purchasing agents for material for about 40 ships being built in shipyards on the Pacific coast, and which are rapidly being completed.

The business in iron and steel scrap of H. Simon is now being conducted by the H. Simon Co. at 627 Guardian Building, Cleveland.



## Pittsburgh Machinery Market

PITTSBURGH, March 5.—Local representatives of machine-tool manufacturers report that, while new inquiry for machine tools is fairly active, the amount of new buying is relatively small. Inquiries for one, two or more machines come in nearly every day, a few of these being placed, and others are not heard of again. The amount of new construction in iron and steel plants in the Pittsburgh district is exceedingly light, and this explains largely the dull demand for machine tools.

There has been recently a fairly heavy demand for iron-working tools from the Youngstown, Ohio, district, much of this coming from the Brier Hill Steel Co. This concern is having built by the Lloyd-Booth department of the United Engineering & Foundry Co. at Youngstown a 32 x 84-in. tandem plate mill and one 38 x 132-in. 3-high plate mill, both to be electrically driven throughout. The Brier Steel Co. has been inquiring from time to time for a considerable number of heavy machine tools for a new shop which this concern will likely build and equip with a full line of tools to take care of the requirements of these two plate mills, and also of other additions which this company is making. The Brier Hill Steel Co. placed last week an order with Manning, Maxwell & Moore, Inc., this city, for a 10-ton electric crane, to be installed in the yards of the Western Reserve Steel Co., which it owns, located at Niles, Ohio.

The Lloyd-Booth department is also building for the Trumbull Steel Co., at Warren, Ohio, a 42-in. blooming mill and an 18-in. bar mill, both complete, with the exception of a few minor accessories to go with the two mills. It is expected the Trumbull Steel Co. may be a considerable buyer of machine tools in the near future.

The Union Drawn Steel Co., Beaver Falls, Pa., which built last year and has now in operation a complete new plant at Gary, Ind., has placed with Manning, Maxwell & Moore, Inc., an order for a 10-ton electric crane to go to the new Gary plant. The Edgewater Steel Co., Oakmont, Pa., near Pittsburgh, has received very heavy orders for gun forgings for the Government, and has installed two large hydraulic presses, one of 6000 tons' capacity and the other 3500 tons, built by the United Engineering & Foundry Co., and in addition the company has lately placed large orders for taps, grinding wheels and other lighter machine equipment to be used in making shells.

The Standard Sanitary Mfg. Co. recently booked an initial order for 5000 shells for the Government and is installing the necessary equipment in its works on Preble Avenue, N. S., Pittsburgh, to make these shells. The company has lately been a large buyer of power hack saws, gage taps, grinding wheels and other miscellaneous equipment.

The Westinghouse Air Brake Co., Wilmerding, Pa., has taken in the past several months large contracts for aircraft for the Government, and this is being built in the new shops of the Union Switch & Signal Co., at Swissvale, near Pittsburgh. The first-named company has been a heavy buyer recently of large sizing taps, grinding wheels, grinding discs, and has inquiries out for similar equipment.

The new inquiry for cranes in the Pittsburgh district has been very quiet for several months, but has lately shown signs of betterment, and some fairly large orders are being placed. The Laughlin & Barney Machinery Co., Union Arcade Bldg., Pittsburgh, has lately taken orders for a considerable number of electric cranes, ranging from 5 to 20 tons in capacity. These cranes are built by the Champion Engineering Co., Kenton, Ohio, the Laughlin & Barney Machinery Co. being local representative. The Cleveland Crane & Engineering Co., through its Pittsburgh office, has sold three 10-ton cranes to the Blaw-Knox Co., for equipment in new buildings it is adding to its plant at Hoboken, Pa.

The Monarch Machine Tool Co. has placed contracts for a new plant it will build at Dayton, Ohio, the main

building to be 65 x 200 ft. and to be built of steel, concrete and glass. It is said the company will be in the market for considerable equipment for this new plant.

The Railway & Industrial Engineering Co., Greensburg, Pa., has received an order from the Government for 100,000 4.7 shells. The company is fully equipped to make these shells.

The Armstrong Cork Co., Pittsburgh, has received a contract for a large quantity of 4.7 shells for the United States Government, which it will build at its Lancaster, Pa., plant. The company is in the market for a considerable quantity of machinery suitable for making these shells.

## Machine-Tool Companies in France Form Association

In anticipation of tightening of control by the French Government over the importation of machine tools into France, an association of machine tool importers has been formed in France to look after interests of factories represented by the members and to afford the Government the co-operation necessary for the proper distribution of machines needed for the national defense.

The association, which is officially known as the *Chambre Syndicale des Représentants Directs de Fabriques Anglaises ou Américaines de Machines Outils et Outillages*, includes among its members the following companies: Alfred Herbert, France, Ltd.; Compagnie Ingersoll Rand, Burton Fils, Cope & Simon, Herbert Morris, Ltd.; Allied Machinery Company de France, J. Ryan, A. Moulin, Société Française Arnold Wicksteel, George E. Fogarty, representative of a group of Fitchburg manufacturers; Hounsfield Fils. The president of the association is F. A. Choffel, managing director of the Ingersoll Rand Co. in France. Membership in the association is limited strictly to individuals, firms or companies of allied nationalities. All members must be direct factory representatives.

## A New High Speed Alloy

Cooperite is a new high-speed alloy, according to the *London Iron and Coal Trades Review*. It has been developed by finding a new use for zirkite in the last few months. Zirkite is a mineral containing zirconium, and it has now been used for the manufacture of a new alloy of nickel-zirconium, called "Cooperite." The new alloy has a bright, silvery luster and a specific gravity much lower than other alloys used for high-speed work. Cooperite contains no carbon or iron, and consequently is not a steel. Its melting point is only about 1150 deg. C., and owing to the fact that the alloy remains in liquid state for a considerable period before solidifying, difficult castings can be made with ease. No heat treatment is said to be required, the hardness being varied by changing the proportion of the constituents. Cutting tools have been produced with a hardness of 250 up to 500 Brinell, the latter still retaining sufficient toughness to withstand heavy roughing cuts.

By a decree dated Jan. 18, effective the same day, the Swedish Government takes control of all trade in copper and copper scrap, including copper unmanufactured or in the rough, electrolytic copper, as well as all scrap or waste containing copper, such as copper scrap, brass scrap, nickel (white metal) scrap, britannia (yellow metal) scrap, and all other scrap in which copper forms a part.

The Continental Shipbuilding Co., Selah S. Masten, president, has purchased a three-acre tract of land on the Hudson River near Yonkers, N. Y., for the construction of steel ships.

# Machinery Markets and News of the Works

## LARGE CONTRACTS PENDING

### War Preparations on a Huge Scale

#### Announcement May Be Made Soon Regarding Plans—New Orders for Browning Guns

Within the next week or 10 days a number of large contracts covering war preparations for 1919 will be awarded in Washington, and these will result in inquiries for machine tools and allied equipment of considerable magnitude. Pending contracts include large guns and shells and entirely new plants for their manufacture will be built. Various departments of the Government will also release orders for tools. The Quartermaster's Department has prepared a list of several hundred tools for repair shops in this country and abroad for delivery during 1918 and 1919, its requirements, as at present estimated, being triple the quantity bought in 1917.

Tests of the new Browning machine guns resulted so successfully that the Ordnance Division of the War Department increased its orders with factories which have been making them and awarded a new contract, said to total \$12,000,000, to the New England Westinghouse Co., Springfield, Mass. The Remington Arms-U. M. C. Co., Bridgeport, Conn., placed an order a few days ago for \$100,000 worth of new tools, and the Marlin-Rockwell Corporation and the Winchester Repeating Arms Co. may also increase their equipment.

A number of shell-loading plants will be built in the East for the Government. The Signal Corps is seeking about 50 tools for making spark plugs. The J. G. White Engineering Corporation, New York, has issued a list of tools for airplane motor manufacture in France. The Pennsylvania Railroad Co. is buying 336 1-ton jib cranes with one-motor hoists for railroad shops in France.

The Ford Motor Co., Detroit, is scouring the country for tools for its new plant at River Rouge, near Detroit, where submarine destroyers will be built. The Worthington Pump & Machinery Corporation, which has the contract for pumps for these boats, has bought a number of new tools for its Harrison, N. J., plant,

where they will be made. The Terry Steam Turbine Co., Hartford, Conn., will make 400 small turbines for operating the pumps, and the C. H. Wheeler Mfg. Co., Philadelphia, will make the condenser pumps.

The large buying of the Savage Arms Corporation, Utica, N. Y., which numbers several hundred tools, valued at \$1,000,000 or more, has been a feature of Eastern machine-tool markets. The Armstrong Cork & Insulation Co., Pittsburgh, will buy a large number of tools for making 4.7-in. shells. The North American Motors Co., Pottstown, Pa., is adding to its equipment for work on 3000 truck motors. The Dupont Engineering Co., Wilmington, Del., has bought machine tools worth \$50,000 to \$75,000 for the Government powder plants at Charleston, W. Va. The Dupont company may build a shell-making and shell-loading plant at Williamsburg, Va.

The American International Shipbuilding Corporation, Philadelphia, is again in the market, having closed for five plate-punching machines, and a list has been issued for 50 pipe machines.

The Stone & Webster Engineering Corporation is placing more orders for the American ordnance base in France. There are reports that a second ordnance base is to be established. Repair shops at army cantonments have called for quite a number of tools.

The Chicago Ordnance Co., Chicago, may soon place machine-tool orders in the Central West. The Winslow Brothers Co., Chicago, has been buying for a shell contract. The Gary Ordnance Co., Gary, Ind., is building a large ordnance plant, regarding which details are lacking.

The Bethlehem Shipbuilding Corporation has closed for 45 engine lathes for building destroyers at its Fore River Works, Quincy, Mass., and 40 have been purchased for destroyers in course of construction at the Union Iron Works, San Francisco.

The Willys-Overland Co., Toledo, Ohio, has bought about \$100,000 worth of machine tools for work on gun carriages. The White Co., Cleveland, will buy for Government work. The Chandler Motor Car Co., Cleveland, has taken a large contract for tractors, but may sublet a part of the work.

Inquiry for cranes is the lightest in many months.

## New York

NEW YORK, March 5.

Following successful tests of Browning machine guns by the Ordnance Division of the War Department, new contracts have been placed for their manufacture. The New England Westinghouse Co., Springfield, Mass., has received a contract reported to total \$12,000,000 and orders previously placed with the Remington Arms U. M. C. Co., the Winchester Repeating Arms Co., and the Marlin-Rockwell Corporation are said to have been considerably increased. The Remington company placed one order for tools in this market a few days ago totaling about \$100,000 and other new equipment will probably be bought. The Government appointed an official of a New York machinery company to make an appraisal of the equipment in the New England Westinghouse Co.'s plant, which, until recently, had been working on Russian contracts. The Russian Government is said to have placed a valuation of \$20,000,000 on the equipment it owns in the Westinghouse factory.

The Savage Arms Corporation, Utica, N. Y., continues to place orders. One order called for 150 tools, another for 100 and similar orders are being placed for various types of tools required for the manufacture of Lewis machine guns for aircraft. The purchases will aggregate more than \$1,000,000.

The Quartermaster's Department in Washington will probably place orders this week for its 1918 and 1919 requirements for machine shops in this country and in France. Its total purchases will number several hundred tools, being triple the number bought in 1917. Other large Government purchasing is in prospect.

The United States Signal Corps last week issued an inquiry from its office at 511 Fifth Avenue, New York, for 30 small lathes, 10 sensitive drills, a number of automatics and other tools for the manufacture of spark plugs for aviation motors.

The J. G. White Engineering Corporation, 43 Exchange Place, New York, has issued a new inquiry for tools to be shipped to plants in France making aviation motors.



The Terry Steam Turbine Co., Hartford, Conn., has received a contract for 400 small turbines for operating pumps on submarine destroyers being built by the Ford Motor Co., Detroit, and may come into the market for additional equipment.

The Lord Construction Co., 105 West Fortieth Street, New York, has been awarded a contract for fitting out 20 wooden hulls being built at various shipyards for the Emergency Fleet Corporation, but will probably fit out a much larger number after its initial contract is completed. Its work will include the installation of engines, boilers and all similar equipment and supplies, even to dishes and silverware. The work will be done at Field's Point, Providence, R. I., where a machine shop, joiner shop and other necessary shops will be built. Two locomotive cranes have been purchased and a third may be required.

The Worthington Pump & Machinery Corporation, New York, has purchased a number of new tools for its Harrison, N. J., plant, where pumps for the submarine destroyers being built by the Ford Motor Co., will be built.

The Government will establish several shell-loading plants in New Jersey, but definite information is lacking. One is to be located a few miles below Trenton and another near Hammonton. The T. A. Gillespie Co., Paterson, N. J., is erecting a shell-loading plant at Morgan.

Crane business is the quietest known in many months. The only large inquiry, aside from Government bidding, is from the Pennsylvania Railroad Co., Philadelphia, which wants 336 1-ton jib cranes with one-motor hoists for shipment to France. The Whiting Foundry & Equipment Co. has received an order from the Brooklyn Rapid Transit Co., Brooklyn, for a 100-ton power house crane for the new Williamsburg power house. The Thompson-Starrett Co., New York, has revised its specifications from a 75-ton to a 50-ton crane for the power house to be built for the Government at its new powder plant near Charleston, W. Va.

The Federal Shipbuilding Co., Kearny, N. J., has acquired about 7 acres in front of its works on the west shore of the Hackensack River, through grant of the State Board of Commerce and Navigation. It will be used for the development of the company's works.

The Stieglitz-Trieber Co., New York, has been incorporated with a capital of \$70,000 by F. J. Trieber, L. and A. Stieglitz, 228 Pearl Street to operate a metal-refining works.

The Pioneer Metallic Packing Co., Brooklyn, has been incorporated with a capital of \$30,000 by C. Eisenhauer, 189 Montague Street, Brooklyn; W. M. Brudi, 3599 Third Avenue, New York; and A. R. Hoefler, 186 Remsen Street, Brooklyn.

The Universal Electric Lamp Co., 843 Broad Street, Newark, has filed notice of organization to specialize in the manufacture of automobile lamps. William Bennett, 110 Elizabeth Avenue, heads the company.

Max Mendle, 31 Clinton Street, Newark, has had plans prepared for a one-story brick foundry, 30 x 95 ft., at 60 Elm Street.

C. A. Goldsmith, operating a brass and bronze foundry at 42 Cutler Street, Newark, has acquired factory property at Thomas Street and Avenue D, reported to be for extensions.

The Heller Brothers Co., 879 Mt. Prospect Avenue, Newark, manufacturer of files, rasps, etc., is planning the construction of an addition to its works on Verona Avenue to cost \$10,000.

The Engravers' & Printers' Machine Co., Sag Harbor, Long Island, N. Y., will break ground shortly for the erection of a factory on Jermain Avenue to take the place of a small factory which it has been occupying for the past five years on Palmer Terrace. William S. Eaton is president.

Announcement is made by the Commercial Iron Works, manufacturer of brass and iron castings, Penn Yan, N. Y., that it will not rebuild its plant recently destroyed by fire.

The Irving Iron Works Co., Third Street, Long Island City, N. Y., structural and architectural iron worker, will build a one-story brick extension, 20 x 80 ft., on Creek Street.

The New Process Die Cutting Corporation, New York, has been incorporated with a capital of \$100,000 by W. L. Gallagher, 204 West Fifty-fifth Street; E. H. Ludeman, 165 Broadway; and T. A. Hardy, 120 Broadway.

The Columbia Ship Fitting Co., New York, has been incorporated with a capital of \$10,000 by C. M. Chute, H. R. Sheahan and E. Patella, 317 Degraw Street, Brooklyn.

The J. E. Fidler Co., 116 West Thirty-second Street, New York, manufacturer of laundry machinery, has filed articles of incorporation with a capital of \$20,000.

The Nurnberg Thermometer Co., 260 East 138th Street, New York, has increased its capital from \$10,000 to \$25,000.

The Duplexalite Corporation, New York, has been incorporated with a capital of \$275,000 to manufacture electric lighting fixtures. L. C. Bunzl, 121 East Seventy-second

Street; H. O. Walter, 60 Wall Street; and L. Roche, Jersey City, N. J., are the incorporators.

The Arch Bed Spring Mfg. Co., New York, has been incorporated with a capital of \$10,000 by C. Dreyer, J. De-commerce and M. Wyner, 1970 Mapes Avenue.

R. G. Granville, Inc., New York, has been incorporated with a capital of \$50,000 to manufacture motor vehicles, airplanes, etc. R. G. Granville, 228 West Seventy-first Street; A. Ross Jarman, 703 West 178th Street; and G. F. Shephard, 150 St. James Place, Brooklyn, are the incorporators.

The Pioneer Iron Works, 149 Pioneer Street, Brooklyn, manufacturer of sugar machinery, boilers, etc., has awarded contract for a one and two-story machine shop, 40 x 80 ft., and one-story forge shop, 65 x 65 ft., to cost \$12,000.

The Murray-Willat Motor & Aeroplane Corporation, New York, has been incorporated in Delaware with a capital of \$5,000,000. J. Joseph Murray, Carl A. Willat and Ernest Shipman, all of New York, are the incorporators.

The Vulcan Tool & Machine Works, Newburg, N. Y., has been incorporated with a capital of \$50,000 to manufacture tools, etc. W. C. Whitney, R. P. Barrett and E. C. Chadborn, Newburg, are the incorporators.

Magid Brothers & Kleinman, New York, have filed articles of incorporation with a capital of \$9000 by L. Kleinman, H. and M. Magid, 747 East 182d Street, to operate a metal spinning and stamping plant.

The Bureau of Yards & Docks, Navy Department, Washington, has awarded contract to Norcross Brothers Co., 103 Park Avenue, New York, for a one and two-story structural shop, 300 x 600 ft., at the Brooklyn Navy Yard, to cost \$1,000,000.

The New York & Queens Electric Light & Power Co., 444 Jackson Avenue, Long Island City, has acquired 9½ acres of land at Elmhurst, fronting on the tracks of the Long Island Railroad, and is reported considering the erection of a new electric station.

The Aetna Explosives Co., Inc., 120 Broadway, New York, will build its proposed smokeless powder works at Huntingdon, Pa., as extension to its works at Mount Union. It is estimated to cost \$500,000.

The A. Bassett Iron & Wire Works, Brooklyn, has been incorporated with a capital of \$10,000 by E. Bright, S. Schub, and A. Bassett, 230 Ainslie Street.

The Sedgwick Machine Works, 84 Carroll Street, Poughkeepsie, N. Y., has acquired property at 150 West Fifteenth Street, New York, for a branch establishment.

The American Automatic Signal Co., Inc., New York, has been incorporated in Delaware with a capital of \$350,000 by S. B. Howard, G. V. Reilly, and A. W. Britton, 28 Nassau Street.

The Standard Concrete Machinery Co., Bulletin Building, Philadelphia, is considering the erection of a plant at Perth Amboy, N. J., to cost about \$30,000.

The Union Iron Works, 603 Newark Street, Hoboken, N. J., manufacturer of pile hammers, derrick excavators, etc., has had revised plans prepared for a one-story brick and steel addition to cost \$14,000.

The Government is having plans prepared for the erection of a building near Fourteenth Street, Hoboken, N. J., to cost about \$1,000,000. It will be known as the Expeditionary Depot and will be used for the manufacture of army equipment, as well as for storing, handling and shipping of materials.

The Economic Carburetor Co., Jersey City, has been incorporated in Delaware with a capital of \$500,000 by Irving Bressaller and M. V. Press, Brooklyn, N. Y., and M. C. Lynch, Jersey City.

The Clucker & Hixson Co., 37 Murray Street, New York, manufacturer of automobile supplies, has purchased a factory building at 145-151 Frelinghuysen Avenue, Newark, N. J., for a new plant.

William E. Quimby, Inc., Newark, has been incorporated with a capital of \$125,000 to manufacture machinery, motor pumps, etc. William E. and G. T. Quimby, West Orange, are the incorporators.

## Buffalo

BUFFALO, March 4.

The Lackawanna Steel Co., Buffalo, is preparing plans for a one-story central turbo generator power plant 100 x 190 ft., to cost about \$200,000.

The Barcalo Mfg. Co., Buffalo, maker of brass and iron bedsteads, has let contract for an addition to its plant at Louisiana and Republic Streets, and the Erie Railroad.

The Transmission Ball Bearing Co., 1050 Military Road, Buffalo, has let contracts for a one and two-story addition



175 x 350 ft. to its plant at Military Road and the New York Central Railroad, to cost \$150,000.

The Certain-Teed Products Corporation, Ellicott Square Building, Buffalo, manufacturer of roofing materials, has secured factory space at Chicago Street and the Lehigh Valley Railroad, which it will equip at once.

The J. T. Brown Co., Philadelphia, has been awarded contract for the erection of a one-story reinforced concrete, steel and brick addition, 200 x 700 ft., to the plant of the Savage Arms Co., Turner Street, Utica, N. Y.

The George C. Broadbooks Co., Inc., Attica, N. Y., has filed articles of incorporation with a capital of \$30,000 to manufacture hardware, etc. W. A. Timm, G. C. Broadbooks, and G. L. M. Ireland, Attica, are the incorporators.

The Durston Gear Corporation, 213 Maltbie Street, Syracuse, N. Y., has filed articles of incorporation with a capital of \$400,000.

The Henner Automatic Oil Carburetor Co., Rochester, N. Y., has been incorporated with a capital of \$100,000 by J. J. McInerney, G. J. Bauer, and G. Henner, Rochester, to manufacture carburetors.

The Symington Forge Corporation, Cutler Building, Rochester, N. Y., is building a one-story forge building, 175 x 340 ft., on University Avenue near Culver Road, to cost about \$150,000. Crowell-Lundoff & Little, 1951 East Fifty-seventh Street, Cleveland, are the contractors.

## New England

BOSTON, March 2.

A gradual spread of sub-contracts from Government and private plants having direct Government orders is responsible for a greatly increased activity in the local machinery market. Reports agree that the number of New England machine-tool and small tool plants buying additional equipment is considerably increased over the preceding weeks and the new demand is for practically every kind of tool. Most of these orders are plainly for balancing equipment for new work, and this movement is expected to continue for some weeks to come. Business with machine-tool plants continues at the same high pitch of past weeks, and there is no evidence that the end is in sight. Government plants in this district continue large purchasers, but no large lists have been reported from private plants.

One large list just closed is that of the Bethlehem Shipbuilding Corporation for 85 motor-driven, 12-in. engine lathes, one each of which is to be placed on the destroyers being built by the company, of which 45 are to be built at the Fore River Works, Quincy, Mass., and 40 at the Union Iron Works, San Francisco.

The coal situation is reported better except in Bridgeport, Conn., where the big plants of the Remington Arms Union Metallic Cartridge Co. have twice within a week been within a few hours of a complete shut-down. By emergency measures they have been kept going, but at some expense to other industries. The anthracite supply for domestic uses has been much improved and this removes one source of worry for manufacturers.

Formation of new metal-working companies and projects for new plants or additions to old plants have decreased to the lowest point for three years. So many difficulties now confront industry in this section that this condition is not likely soon to change. New capital issues are being discouraged, and there is little incentive to increase plants when there is a shortage of nearly every essential necessary for their operation.

The machinists' unions are carrying on an intensive campaign for new members, especially in Connecticut, but little labor trouble is reported, although there is some unrest in two or three places where demands have been made but not vigorously pressed.

The Hamilton & Chambers Co., New York, has been conferring with the city officials of Providence, R. I., regarding a proposed location in that city of a permanent 1000-ft. drydock and a floating 650-ft drydock with repair plant and machine shop. It is reported that the company's action follows a conference of George L. Crocker, president Providence Chamber of Commerce, with Gen. George W. Goethals, acting Quartermaster General, and Edward F. Carry of the Shipping Board.

The Crompton & Knowles Loom Works, Worcester, Mass., has awarded a contract for a one-story addition to its foundry.

The New England Pressed Steel Co., Natick, Mass., is soon to have, through the action of the Natick Building Association, an addition, 67 x 86 ft., two stories.

The Onlee Headlight Controller Co., Springfield, Mass., has been incorporated with authorized capital stock of \$75,000. C. G. Yager is president and Eva J. Scott, 22 Edgemont Street, treasurer.

The Universal Boring Machine Co., Hudson, Mass., has had plans drawn for a one-story addition, 40 x 100 ft.

The U. S. Turbine Mfg. Co., Quincy, Mass., has been incorporated with authorized capital stock of \$50,000. George A. Weaver is president.

## Philadelphia

PHILADELPHIA, March 4.

There is a much improved buying movement in the Philadelphia district, due partly to new Government orders and partly to the betterment in weather and shipping conditions. Machine-tool men who have been in touch with a number of manufacturers the past week say there is surprisingly little anxiety over supplies of raw materials, and production is being speeded up as much as possible to make up for time lost during the recent cold weather and on the coal-saving holidays. A machine-tool man who visited 10 manufacturing plants in or near Philadelphia last week says that only one of the 10 was not in the market for new equipment of some kind. Inquiries for small lots of tools are numerous.

The Armstrong Cork & Insulation Co., Pittsburgh, has been awarded a contract for 4.7-in. shells for the War Department and has issued a large list of machine tools it will buy.

The North American Motors Co., Pottstown, Pa., came into the market last week for additional equipment for work on a contract for 3000 truck motors. This company now has two plants, one working on 6-in. shells and the other on motors.

The Vulcan Iron Works, Wilkes-Barre, Pa., has placed contract with John Curtis & Co. for an addition, 75 x 190 ft., to its plant at West Pittston, Pa., which will increase its floor space about 100 per cent.

The C. H. Wheeler Mfg. Co., Philadelphia, has received a contract for condenser pumps for the submarine destroyers being built by the Ford Motor Co., Detroit, and placed orders last week for about 10 new machine tools.

The Stone & Webster Engineering Corporation placed additional orders here within the past week for shipment to the American ordnance base depot in France and the Pennsylvania Railroad Co.'s purchasing department has bought additional equipment for the railroad engineers in France.

The De Laval Steam Turbine Co., Trenton, N. J., is engaged on important Government work and is seeking a number of large tools.

The Procurement Division of the War Department has placed orders with a local machine-tool dealer for tools for repair shops at army cantonments.

The Dupont Engineering Co., Wilmington, Del., which is building a large powder plant for the Government, bought machine shop equipment costing \$50,000 to \$75,000 last week. The orders were divided among three local dealers. Representatives of the dealers were summoned to the Dupont purchasing office at the same time and the orders were divided according to the best prices and delivery. Where there was a close contest the awarding of the order was decided by the flip of a coin.

E. I. du Pont de Nemours & Co., Wilmington, will build a shell-making and shell-loading plant for Government work at Williamsburg, Va., and will, it is reported, come into the market soon for a large number of tools.

The Baltimore Dry Dock & Shipbuilding Co., Baltimore, will purchase machine shop and other equipment soon.

The American International Shipbuilding Corporation is in the market for 50 pipe machines and other equipment for its Hog Island shipyard. An order has just been placed for five plate punching machines.

The International Fabricating Co., Wilkes-Barre, Pa., and the American Die & Tool Co., Reading, Pa., are each in the market for a few tools for Government work.

The A. H. Fox Gun Co., Philadelphia, which recently occupied a new factory, is at work on gun parts for the Colts Patent Firearms Mfg. Co., Hartford, Conn.

The Mac-it Parts Co., Lancaster, Pa., maker of screw machine products, has contracted with the Strong, Carlisle & Hammond Co., Cleveland, to handle its entire output. The directors of the two companies are the same.

The Schutte & Koerting Co., Philadelphia, which has been taken over by the Alien Property Custodian, has elected the following new officers: Charles S. Caldwell, president Corn Exchange Bank of Philadelphia, president; D. W. Hildreth, former treasurer of the Schutte & Koerting Co., treasurer; Ralph J. Baker, assistant general counsel for the Alien Property Custodian, secretary. These, with E. Pusey Passmore, governor of the Federal Reserve Bank of Philadelphia, and T. H. Johnston, form the board of directors.

The Freeland Foundry & Machine Co., Freeland, Pa., recently organized, has elected William Touhill president,

Stanley E. Oberrender treasurer, P. J. Dever secretary, as well as the following directors: William Touhill, John Touhill, Stanley E. Oberrender, James W. Boyle, E. J. Edwards, Henry George, C. Douite. It is putting the former Salmon plant in shape for operation beginning April 1.

The Quaker City Iron Works, Tioga and Richmond streets, Philadelphia, has taken out a permit for the erection of a one-story brick machine shop, 60 x 65 ft.

The Tacony Steel Corporation, Milnor and Bleigh streets, Philadelphia, has acquired property at Bleigh and Spring streets and Bleigh and Eugene streets for \$65,000, to be used, it is said, for extensions. The company is having plans prepared for a locomotive shop and other structures, consisting of three one-story buildings, 35 x 85 ft., 17 x 23 ft., and 23 x 25 ft.

Robert Howarth Sons, Chester, Pa., has been incorporated with a capital of \$30,000 to manufacture machinery. Casper Howarth is the principal incorporator.

A new one-story steel and concrete power plant for works operation will be erected by the Lycoming Rubber Co., Williamsport, Pa., at Rose Street and Erie Avenue.

The Atlas Powder Co., Wilmington, Del., has awarded a contract to the Austin Co., Philadelphia, for the erection of three one-story additions to its plant at Reynolds, Pa., to cost about \$150,000.

Fire Feb. 27 destroyed the boiler shops of the Boviard & Seyfang Mfg. Co., Davis Street, Bradford, Pa., manufacturer of oil well supplies, with loss estimated at about \$10,000.

The Susquehanna Casting Co., Wrightsville, Pa., has been incorporated with a capital of \$75,000 to manufacture iron and steel castings, etc. Ralph P. Wilton is the principal incorporator.

The Blaw Knox Steel Co., Hoboken, Pa., has commenced the construction of a one-story mill addition, 100 x 500 ft.

The American Color Co., Coal Exchange Building, Scranton, Pa., has broken ground for a two-story addition to cost \$40,000.

## Baltimore

BALTIMORE, March 4.

The Overton Reduction Machinery Corporation, 812 Equitable Building, Baltimore, has been incorporated with \$78,000 capital stock to manufacture machinery. The incorporators are Harry Lee Siegel, Moses W. Rosenfeld and Samuel H. Folkoff.

The Bartlett-Hayward Co., Scott and McHenry streets, Baltimore, will build a one-story, 62 x 165-ft. heat-treating building to cost \$45,000 and a one-story brick boiler house, 54 x 90 ft., to cost \$21,000.

The U. S. Mfg. Co., 3 East Lexington Street, Baltimore, has been incorporated with \$15,000 capital stock by Richard E. Preece, Frank E. Welsh, Jr., and Thomas H. Sanks to manufacture musical instruments.

The Westbrook Elevator Mfg. Co., Danville, Va., has been chartered with \$75,000 capital stock. A. B. Carrington is president.

The Norfolk Glass Mfg. Co., Norfolk, Va., recently incorporated with a capital of \$250,000, has acquired 10 acres on the Norfolk Southern and Virginian railroads as a site for a one and two-story plant for the manufacture of glass bottles. Plans for a structure, estimated to cost \$50,000, are being prepared. J. Wiley Halstead is president.

The Norfolk Copcrete Boat Co., Norfolk, Va., recently incorporated with a capital of \$1,000,000, is planning the construction of a shipbuilding plant on a 55-acre site on the southern branch of the Elizabeth River for the production of 700-ton to 1000-ton concrete barges. Fred D. Doty is president.

The Lynchburg Glass Works, Lynchburg, Va., has filed articles of incorporation with a capital of \$300,000. N. D. Eiler and D. B. Ryland are the principal incorporators.

The Government has had plans prepared for a number of additions at the Norfolk Navy Yard, to comprise a new pattern shop to cost about \$600,000, a power plant to cost \$575,000, and auxiliary structures.

The Florida Glass Co., Tampa, Fla., has been incorporated with a capital of \$250,000 to manufacture glass and glassware. C. J. Earley, Paul T. Davis, L. M. Stahl, Tampa, are the incorporators.

The Daytona Public Service Co., Daytona, Fla., has filed notice of an increase in its capital from \$300,000 to \$500,000 for extensions to its plant.

The Hec Mfg. Co., 82 Marietta Street, Atlanta, Ga., is planning the installation of new equipment in its plant for the manufacture of steel, brass and copper specialties.

## Chicago

CHICAGO, March 2.

Munitions contractors who are operating, or preparing to do so, continue to buy to round out their equipment, and there has been a fair volume of business from small firms who usually are found to have contracts for parts required in one or another kind of war work. No new propositions of noteworthy size are reported, although large orders may be placed against preliminary inquiries which have been made. One of these is from the Chicago Ordnance Co., back of which are several Chicago business men. The Arnold Co., Chicago, engineer, has been gathering information on a large quantity of equipment.

The Illinois Steel Co., Chicago, has been in the market for tool-room equipment for a shop at its Joliet, Ill., plant, and similar equipment has been purchased by the Winslow Brothers Co., Chicago, which has a shell contract. The American Bridge Co. has bought tools for a new machine shop at South Chicago. Considerable uncertainty exists in some quarters as to the actual backers of the Gary Ordnance Co., Gary, Ind., for which the American Bridge Co. has been erecting a building. Those in charge of the project have not yet given any information concerning it.

Machine tools of the lighter types are not in large demand and are easily obtainable for prompt delivery, often from stock.

In February only 93 building permits, representing a value of \$2,376,000, were issued in Chicago, against 309 permits, involving a cost of \$3,657,000 in the same month a year ago. The falling off is attributed to the wish of the Government that there shall be no building that is not essential to the successful prosecution of the war.

The Kropp Forge Co., Chicago, has purchased 8 acres at West Twelfth Street and South Fifty-fourth Avenue, Chicago, on which will be erected buildings covering about half the area and which will be completed by June or July. The company has large Government orders.

W. G. Ehrhart, 34 North Franklin Street, Chicago, has been awarded the general contract for remodeling a one-story car barn, 120 x 182 ft., at East Ninety-fifth Street and Ewing Avenue, which will be used as a factory for the manufacture of springs and tires by the Johnstone Shock Absorber Co., 65 East Twenty-eighth Street, Chicago.

The Ilg Electric Ventilating Co., Chicago, has purchased 214,282 sq. ft. of land at Elston Avenue and Snow Street, Chicago, on which will be erected a group of manufacturing buildings which will cost about \$750,000. They will be four-story, fireproof and constructed in units, 60 x 300 ft., connected by passageways and having 80-ft. light courts. Plans for the buildings, which will contain every provision for the welfare of employees, are being prepared by Lehenbaum, Marx & Vigeant, architects, 175 West Jackson Boulevard, Chicago.

Two acres of land at California Avenue and Thirty-first Street, Chicago, have been purchased by the Ketter-Elliott Construction Co., as the site of a building, to cost \$100,000, to be used for the fabrication of structural steel.

The Standard Forging Co., Indiana Harbor, Ind., is completing the erection of a large plant for ordnance work, and it is reported that 1500 additional men will be engaged.

The Black Brothers Mfg. Co., Mendota, Ill., has been awarded a Government contract for the manufacture of clamps used in the production of airplanes, and expects to obtain additional orders of the same kind.

Fire in the heat-treating building of the Root & Van Dervoort Engineering Co., East Moline, Ill., Feb. 25, damaged the plant to the extent of \$20,000. The company has war orders, and will rebuild at once.

The Hawkeye Truck Co., Sioux City, Iowa, has been incorporated with a capital stock of \$300,000, to take over the Hawkeye Mfg. Co. and continue the manufacture of motor trucks. R. A. Bennett is president of the new company; A. T. Bennett, treasurer; F. W. Kemp, vice-president, and L. D. Baggs, secretary.

The Amalgamated Machine Corporation, 72 West Adams Street, Chicago, is erecting a two-story brick assembling shop, 50x265 ft., at 3700 South Racine Avenue, to cost \$40,000.

## Detroit

DETROIT, March 4.

Inquiries for a large number of standard machines have resulted from increased activity of shell making, automobile and shipbuilding firms, whose products go to the Government. With very few exceptions, no orders and inquiries are coming from small companies engaged in general manufacturing.

It is understood that most of the machines for the new



plant of Ford Motor Co., in which submarine chasers will be built, have been contracted for in all parts of the country, wherever they could be picked up.

Deliveries on some standard machines can now be had in about 90 days, while other types require but 30 days.

The demand for skilled laborers is steadily increasing, with little probability that the supply will increase. Construction work is opening up, due partly to better weather conditions for building.

The Detroit Shipbuilding Co., Detroit, has let a contract for a one-story brick and frame carpenter shop, adjoining the new addition to its plant.

The Studebaker Corporation, Detroit, has let contracts for a brick and steel addition to its factory, on Clark and West Jefferson avenues.

The Detroit Architectural Iron Works, Detroit, has been merged with the Page Steel & Wire Co., Adrian, Mich., formerly known as the Page Woven Wire Fence Co. A branch plant is located at 660 Fort Street West, Detroit.

The National Machine & Stamping Co., Detroit, has been incorporated at \$50,000 under the name of the Consolidated Machine Co.

The Massey-Harris Harvester Co., Inc., Batavia, N. Y., has been incorporated at Lansing, Mich., with a capital of \$3,000,000.

The Industrial Terminal Corporation, Detroit, has increased its capital from \$10,000 to \$1,000,000.

The Michigan Copper & Brass Co., Detroit, now has in operation a new thin metal mill, for turning out metal for motor radiators. The officers are: President, David M. Ireland; first vice-president, James T. Whitehead; second vice-president, Hal H. Smith; general manager, Alonzo P. Ewing; secretary, Alfred L. Simmons; treasurer, John L. Connell; general superintendent, David Burgess.

The Carde Stamping & Tool Co., Saginaw, Mich., manufacturer of tools and sheet metal stampings, has been organized and has taken over the plant of the Bransfield-Billings Co. Alex R. Pribl, Detroit, formerly connected with the General Electric Co., is general manager. Associated with him are Clyde P. Crane, Detroit, and C. B. Castle, Cleveland. The company owns and controls patents on pressed steel connecting rods and pressed steel pistons which will be manufactured for the automobile trade.

The Freuhof Trailer Co., Detroit, has been incorporated with \$150,000 capital stock by August C. Louis, E. M. and Harvey C. Freuhof.

The W. J. Baird Machinery Co., Detroit, Mich., dealer in new and second-hand machinery, tools and supplies, has moved into new quarters at Jefferson Avenue and Brush Street, where it occupies a six-story and basement building, equipped for handling and displaying machine tools and other lines and providing a large increase of floor space.

Fire, Feb. 18, caused a loss of approximately \$80,000 to the plant of the Detroit Metallic Bed Co., 102 West Larned Street, Detroit.

The Grand Rapids Screen Co., 101 Campau Avenue, Grand Rapids, Mich., is removing its plant and equipment to a new building at 595 Division Avenue recently acquired.

## Milwaukee

MILWAUKEE, March 4.

Machine-tool manufacturers continue to receive orders in large volume and conditions show little or no change from the extreme pressure upon facilities. New business is coming in small lots on repeat orders, the originals of which in some instances are only partially filled. Makers of milling machinery are particularly pressed for standard and special sizes and on some of these deliveries can only be specified eight to nine months ahead.

An excellent demand for machine tools is reported by local jobbers, who are pressed for a variety of metal-working machinery by manufacturers of motor trucks, tractors, gas engines and similar products. These industries are expanding rapidly and numerous new companies are entering the field. No lists of large size have made their appearance the past week, but manufacturers who are building additions or contemplate extensions have put forth inquiries for lots of fair size.

The Kissel Motor Car Co., Hartford, Wis., has awarded contracts for two one-story, reinforced concrete and brick assembling shop additions, 40 x 200 ft. and 40 x 100 ft. Work will begin at once and it is planned to have the shops ready by April 15 or May 1. The Kissel company is in the market for machine-tool and other equipment. George A. Kissel is president and O. P. Kissel, general manager.

The C. A. Lawton Co., DePere, Wis., founder and machinist, has broken ground for a new two-story building, 40 x 120 ft., the first floor to be used as a machine shop

and smithy, and the second floor as a pattern shop. The Lawton company's pattern shop was destroyed by fire early in January. The present main shop is 60 x 120 ft., two stories.

The General Tool & Mfg. Co., Milwaukee, has been incorporated with a capital stock of \$15,000 to manufacture tools and machinery. The incorporators are George H. Ahlswede, Fred Zinzow and E. J. Stanke. Definite announcement of plans will be made later.

The Universal Tool & Apparatus Co., Milwaukee, has changed its corporate style to the Universal Tool & Appliance Co. William Baum, dean of the School of Engineering, Stroh Building, is secretary.

The Eagle Mfg. Co., Appleton, Wis., has commenced the installation of machinery and equipment in its new main building, 120 x 120 ft., which will be devoted exclusively to the manufacture of tractors. It has just made the first carload shipment on a large order for tractors from the Italian Government.

The Babcock Automobile Spring Co., 192 Milwaukee Street, Milwaukee, has awarded contracts for the erection of a new plant and service station costing \$25,000 at Jefferson Street and Juneau Avenue. It will be 60 x 128 ft., two stories and basement.

The A. C. Electric & Novelty Co., 224-226 Fourth Street, Milwaukee, is preparing to rebuild its plant and warehouse, which was gutted by fire on Feb. 22 with a loss estimated at \$25,000. The equipment was badly damaged and much of it will have to be replaced.

Metzig Brothers, Berlin, Wis., are installing new equipment and machinery, including drill presses and other tools and an oxy-acetylene welding outfit and henceforth will devote their shop to general machine work.

The Western Malleables Co., Beaver Dam, Wis., has completed a new pattern shop and storage building costing \$25,000 at its Center Street plant to replace the unit destroyed by fire last fall.

The Weidemann-Lindem Mfg. Co., 904 Water Street, Marinette, Wis., will enlarge its plant and install additional wood-working machinery for the manufacture of caskets and coffins.

The Northwestern Ordnance Co., Madison, Wis., has completed its new plant and is now operating practically at full capacity. The initial output is one gun each working day and shipments are being made at the rate of two carloads per month. The company is manufacturing 4.7-in. field pieces, ready for mounting upon the carriage.

The LaCrosse Plow Co., LaCrosse, Wis., has increased its working force to 350, the limit of the present plant, to meet the extraordinary demand for tools and machinery for farm work. Orders now booked will require maximum operations for more than six months.

The Townsend Mfg. Co., Janesville, Wis., expects to occupy several new shop additions about May 1. The new buildings are a forge and sheet metal shop, 40 x 60 ft.; machine-shop and assembling floor, 60 x 120 ft., and office building, 24 x 30 ft. It is building a 30-hp. Townsend oil engine in its own shops to supply additional power for the enlarged facilities. The output of tractors for 1918 will be from 650 to 700.

The Jenkins Machine Co., 315 North Eighth Street, Sheboygan, Wis., has had plans prepared for a two-story addition, 45 x 60 ft.

## Cleveland

CLEVELAND, March 4.

Demand for machine tools for Government work continues heavy. The Willys-Overland Co., Toledo, Ohio, is in the market for about \$100,000 worth of machinery equipment for gun carriage work, including 25 turret lathes. It is reported that the White Co., Cleveland, will shortly issue a large list of machines for an extension to increase its motor truck capacity. It is understood that the Government order recently taken by the Chandler Motor Car Co., Cleveland, for tractors is for 2000 large type weighing about 10,000 lb. each. The Chandler company, which has placed contract for an extension to take care of this work, has not yet decided whether it will do the bulk of the machine work or distribute it among sub-contractors. It is now inquiring for castings and other parts. Several inquiries for round lots of machines for Government work, which came out recently, are still pending, but are expected to result in the placing of orders shortly. Local machinery houses report a good volume of business the past week, but entirely for small lots or single machines coming from manufacturers of motor tractors, truck, airplane parts, and other companies having Government work. Detroit automobile manufacturers engaged on Government orders are still buying quite freely. Findlay, Ohio, manufacturers are figuring on some Government business which, if distributed in that city, will necessi-

tate the purchase of a large amount of machinery. Deliveries on small lathes and drills and other tools in the smaller sizes show some improvement.

The White Co., Cleveland, has placed contracts for a one-story and basement extension, of brick, steel and concrete, 185 x 400 ft., with a wing, 90 x 185 ft. Plans have been prepared by the Watson Engineering Co., Cleveland.

The Chandler Motor Car Co., Cleveland, will erect a one-story steel and concrete factory, 80 x 400 ft., so constructed that four additional stories can be erected later. Plans are being prepared by Ernest McGeorge, engineer, Leader-News Building, Cleveland. For the present the plant will be used to manufacture tractors for the Government.

The National Carbon Co., Cleveland, will erect additions to its plant at Niagara Falls, N. Y., including a two-story building, 20 x 144 ft., one-story building, 70 x 144 ft., six-story building, 63 x 108 ft., and one-story building, 49 x 70 ft. They were designed by the Osborn Engineering Co., Cleveland, and are being erected by the Hunkin-Conkey Construction Co., Cleveland, which is now erecting three other buildings for the National Carbon Co. at Niagara Falls.

Plans for the new one-story building, 90 x 200 ft., to be erected in Cleveland by the Anchor Post Iron Works are being prepared by George S. Rider & Co., Cleveland.

The Blair Motor Truck Co., Newark, Ohio, contemplates building an extension to its plant. It is stated that the company will be taken over by a new organization with a capital stock of \$1,500,000, of which J. D. Potter, formerly president of the Kilburn-Jacobs Mfg. Co., Columbus, Ohio, is president.

The Austin Co., Cleveland, is preparing plans for a new one-story factory, 135 x 450 ft., for the Warner Gear Co., Muncie, Ind.

The Pioneer Rubber & Specialty Co., Akron, Ohio, has purchased a site in Willard, Ohio, where it proposes to build a new plant.

The Monarch Machine Tool Co., Sidney, Ohio, has placed a contract with the Bellefontaine Bridge Co., Bellefontaine, Ohio, for the structural steel for its new plant, 60 x 200 ft.

The Northern Ohio Traction & Light Co., Akron, Ohio, will place contracts shortly for boiler house, laboratory and other buildings.

The Ohio Tread Tire & Mfg. Co., Sandusky, Ohio, recently organized with a capital stock of \$500,000 to manufacture tires and other rubber goods, is having plans prepared for a new factory.

The Canton Art Metal Co., Canton, Ohio, is in the market for a second-hand shaper.

## Cincinnati

CINCINNATI, March 4.

Machine tool builders are expecting some heavier rush orders directly from the Government. The ordinance division is said to be interested in obtaining some machines quickly, and according to the present rumored program Government purchases will exceed expectations.

Certain sizes of lathes are easier to obtain for early shipment but planing machines are very scarce. Shaping machines are also in demand, and makers are booked up for some time ahead. Slow deliveries of castings from jobbing foundries cause considerable delay in many shops.

Building operations for the month of February show a decided falling off over last year's record. The Cincinnati Building Commissioner's report for February, 1918, gives the value of estimated improvements at only \$249,700, as compared with February, 1917, at \$841,490. In spite of the high cost of building material a number of shop extensions are planned.

It is reported, but not officially confirmed, that the Cincinnati Milling Machine Co. is planning to make an extensive addition to its plant in Oakley suburb.

The United States Electrical Tool Co., Cincinnati, is having plans prepared for an addition to its factory, 60x100 ft., two stories, of brick and steel.

The Davis Welding & Mfg. Co., Cincinnati, has been incorporated with \$75,000 capital stock, and will operate an oxy-acetylene welding plant. Augustine Davis, Jr. is president.

It is stated that work on the new plant of the J. A. Fay & Egan Co., Cincinnati, in Bond Hill suburb will be commenced at an early date. The estimated cost is \$500,000.

The Fulflo Pump Co., Blanchester, Ohio, is contemplating an addition to its new plant. Its sales offices are in the Mercantile Library Building, Cincinnati.

The Columbia Machine Tool Co., Hamilton, Ohio, has increased its capital stock from \$50,000 to \$100,000, and con-

templates an addition to its plant on the Middletown Pike. E. S. Rich is vice-president and general manager.

The new plant of the Liberty Machine Tool Co., Hamilton, Ohio, is now under roof, and the installation of equipment will be commenced at an early date.

The Dayton Tool Co., Dayton, Ohio, has been incorporated with \$35,000 capital stock by Frank A. Hahne and others.

The Dayton Metal Products Co., Dayton, has awarded contract for a one-story reinforced concrete addition to its plant, 150x180 ft.

The new plant of the American Water Motor Co., Columbus, Ohio, will be one story 45x90 ft.

The Pennsylvania Railroad Co. has let contract to D. W. McGrath, Columbus, Ohio, for the construction of two buildings for its proposed locomotive repair shop at Columbus. Contract for three additional buildings will be let at an early date.

The Monarch Machine Tool Co., Sidney, Ohio, whose plans were recently mentioned, has commenced work on an addition to its plant, 65x200 ft., one story, of steel and concrete.

The Dayton Malleable Iron Co., Ironton, Ohio, is installing additional equipment in its plant that will greatly increase its output of malleable castings.

The plant of the A. D. Cook Pump Works Co., Lawrenceburg, Ind., was slightly damaged by fire Feb. 26. No delay in operations resulted.

## The Central South

LOUISVILLE, March 4.

The Southern Machine Co., Chattanooga, Tenn., recently formed, has started to overhaul the former Morris-Sherman plant for use as a munition factory. It has laid plans to start operations about May 1. The capacity is planned to reach 2000 6-in. shells per day. Morrow Chamberlain is president; Capt. C. A. Lyerly, vice-president; J. M. Trimble, secretary; W. A. Sadd, treasurer; and H. M. Lofton, general manager. The board of directors is made up of these officers and Z. C. Patten, Jr., of Chattanooga, and J. M. Conway, Frank Hawkins and W. S. Banks of Atlanta, Ga.

The John C. Duncan Co., Jackson Avenue, Knoxville, Tenn., is in the market for a 150-hp. return tubular boiler, from 100 to 125 lb. working pressure.

Prices are asked by the Jonesboro Supply House, Jonesboro, Tenn., on a second-hand 14-in x 6-ft. lathe, also a 30-hp. return tubular boiler.

The Guyan Machine Shops, Logan, W. Va., are in the market for a 150-hp., three-phase, 60-cycle motor of 850 r.p.m.

The Davis Price Foundry & Machine Co., New Cumberland, W. Va., has been taken over by the Hancock Foundry & Machine Co., of which G. L. Bambrick is president. The new owners propose to turn out eight tons of gray iron castings per day.

Fire Feb. 18 partially destroyed the plant of the Embury Box Co., Louisville, with loss estimated at \$10,000.

## Indianapolis

INDIANAPOLIS, March 4.

The American Die Casting Co., Indianapolis, has been incorporated with \$100,000 capital stock to manufacture metal products. The directors are Lawrence Olsen, L. C. Olsen and William R. Jenkins.

The Weidely Motors Co., Indianapolis, is planning to increase its output to 100 motors per day by Sept. 1. It has a three-year contract with the Cleveland Tractor Co. amounting to \$20,000,000. T. C. Rapp is president; Edward Showers, Bloomington, Ind., chairman of the board of directors; George A. Weidely, vice-president, and William A. Umphry, secretary-treasurer. Charles G. McCutcheon and W. H. Watson are other directors.

The National Gas & Power Co., Indianapolis, has been incorporated with \$100,000 capital stock to generate electricity. The directors are E. C. Lewis, W. W. Wiswell and J. B. Detwiler.

The Liberty Pressed Metal Co., Kokomo, Ind., has been incorporated with \$5,000 capital stock to manufacture metal articles. The directors are J. W. Johnson, A. G. Seiberling, J. P. Grace, F. S. McNeal and A. V. Conradt.

The Automatic Bale Tie Co., Kokomo, Ind., has been incorporated with \$70,000 capital stock to manufacture balers. The directors are Theodore M. Connor, Thomas S. Pearson, Morris M. Greenstreet, James R. MacReynolds and John Marshall.



The Anderson Co., South Bend, Ind., has been incorporated with \$20,000 capital stock to manufacture automobile parts. The directors are John W. Anderson, Adam Keasey and A. G. Graham.

The Hill Pump Co., Anderson, Ind., has increased its capital stock from \$250,000 to \$500,000.

The Exhibitor Mfg. Co., Kentland, Ind., has been incorporated with \$40,000 capital stock to manufacture machinery. The directors are John G. Davis, Amos D. Morris and C. M. Holloway.

The Indiana General Service Co., Elwood, Ind., has increased its capital stock from \$1,000,000 to \$3,500,000.

The Service Motor Truck Co., Wabash, Ind., has had plans prepared for a one-story brick and steel addition to its plant, 75 x 250 ft.

## St. Louis

ST. LOUIS, March 4.

The Greenville Warehouse & Compress Co., Greenville, Miss., has been organized with a capital of \$200,000 and will install heavy compressing equipment.

The Farmers' Co-operative Gin, Stratford, Okla., has been organized by E. B. Forrest, R. L. Beckham and others and is in the market for about \$15,000 worth of machinery.

The Conway Cotton Oil & Gin Co., Conway, Ark., will rebuild its burnt plant. About \$20,000 worth of machinery will be needed.

E. W. Leverett, superintendent of light, water and sewer systems of Conway, Ark., will take bids for generating unit and power plant equipment to supplant equipment of 150 hp. now in use.

Additional equipment will be installed in the electric light and power plant at Clinton, Miss., at an expenditure of about \$8,000.

The Consumers' Electric Co., Kahoka, Mo., L. R. Sherrill, manager, will install about \$25,000 worth of new equipment.

H. H. Bronson, Lewistown, Mo., is in the market for direct current generators.

Laverne, Okla., will expend about \$13,000 for additional electric light and power plant equipment.

Miami, Okla., will extend and improve its electric light and power plant, expending about \$45,000 on mechanical equipment.

The Williams Mill Mfg. Co., Texarkana, Ark., will erect a plant, 36 x 285 ft., for the manufacture of machinery to cost about \$100,000.

The Ardmore Producing & Refining Co., Ardmore, Okla., capital \$200,000, will equip an oil refinery. Joseph Willford, Ardmore, A. W. Robers, of Wilson, Okla., and L. D. Moore, Chicago, Ill., are interested.

The Department of the Interior, Washington, D. C., will build an oil and gas experiment station at Bartlesville, Okla., and is in the market for the equipment.

The Carolyn Metal Co., Oklahoma City, Okla., has been incorporated with a capital stock of \$200,000 by N. S. Darling, Edwin Bancroft and Ben Barnett to equip a metal-working plant.

The Planters Oil Mill & Gin Co. of Kosciusko, Miss., is in the market for coal handling and unloading machinery.

The Elliott Electric Co., Shreveport, La., manufacturer of electric fixtures, is planning for the installation of additional equipment.

## Texas

AUSTIN, March 2.

The Galveston Dry Dock & Construction Co., Galveston, which will build a floating dry dock to cost approximately \$900,000, including machine shops, has been incorporated. H. H. Langben is president and T. J. Anderson consulting engineer.

The Kreuger Machinery Co., San Antonio, which has been incorporated with a capital stock of \$100,000, will erect a manufacturing plant. Max E. Krueger is a stockholder.

The Eagle Pass Ice Mfg. Co., Eagle Pass, will install additional machinery at a cost of about \$20,000.

The E. I. du Pont de Nemours Co., Wilmington, Del., with a capital stock of \$240,000,000 has been granted a permit to do business in Texas, with headquarters at San Antonio.

The Indiana Handle Co., Houston, will enlarge its plant and install additional machinery at a cost of about \$20,000.

The Mutual Irrigation Co., McAllen will construct an irrigation system in that vicinity and install a pumping plant at a cost of about \$50,000.

The Lone Star Shipbuilding Co., Beaumont, has been awarded a Government contract for equipping 22 wooden

ships now being built on the Gulf Coast. It is stated that the Government will supply the necessary machinery and other equipment and that the contract covers only the cost of labor. The sum involved, however, is approximately \$5,000,000. The company will immediately begin the construction of machine shops, wharves and warehouses at a total cost of about \$400,000. It is now constructing four wooden ships for the Government and has a contract to build four more.

## The Pacific Northwest

SEATTLE, WASH., Feb. 26.

Mining activities have been hampered by shortage of labor and exorbitant smelting charges. Mining machinery is in big demand, particularly labor-saving equipment.

Farming machinery has been very active, and the call for equipment to displace men has become particularly heavy.

The car shortage is still serious, but shows signs of early improvement. Lumber mills are particularly affected. Every effort is being made to increase the output of lumber, especially spruce, for airships. Last year British Columbia showed an increase of 30 per cent, notwithstanding the fact that production was seriously handicapped by the limited labor supply. Wherever possible machinery is being installed to take the place of the inadequate supply of labor.

The Farmers Elevator & Supply Company, Moro, Ore., will build two elevators at Moro, to cost \$70,000 and install machinery at a cost of \$12,000.

The American Concrete Pipe & Shipbuilding Co., Tacoma, has been incorporated to construct concrete ships of 3500 tons. L. Y. Stayton, president, operates a concrete sewer pipe manufacturing plant in Tacoma.

The Albany Furniture Factory, Albany, Ore., will erect an addition to its plant, and install new machinery.

It is reported that the Western Canada Shipyards, Vancouver, B. C., will make extensions to its plant. It has contracts for six vessels for the Imperial Munitions Board.

The Commercial Boiler Works, Seattle, contemplates the construction of an addition, 55x120 ft., to be equipped with new machinery.

The West Coast Shipbuilding Co., Everett, Wash., incorporated for \$1,000,000 will build a plant in that city, for the construction of concrete ships for the French Government. A site has been secured.

The Western Iron Works, Spokane, has filed articles of incorporation, with capital stock of \$300,000.

The Eagle Rock Box & Lumber Co., Wenatchee, Wash., has been incorporated, and will construct a factory to have a daily output of 6000 boxes.

The Thorsen-Hendrickson Lumber Co., Toledo, Ore., plans the construction of a sawmill with a daily capacity of 100,000 ft.

The Klamath Iron & Steel Works, Klamath Falls, Ore., is building a new foundry and machine shop to be completed within 60 days.

## Canada

TORONTO, March 4.

The Ohio Tuec Vacuum Cleaner Co., Ltd., Toronto, has been incorporated with a capital stock of \$50,000, by Joseph M. Bullen, 44 King Street West, Harold L. Steele, Wendell Osborne and others, to manufacture vacuum cleaners, machinery, etc.

The Commonwealth Steamship Co., Ltd., Toronto, has been incorporated with a capital stock of \$750,000 by Joseph M. Bullen, 44 King Street West; William Levy, Harold L. Steele and others to build ships, machinery, etc.

The Acme Engineering Co., Ltd., Toronto, has been incorporated with a capital stock of \$125,000 by Ewart R. Lynch, Traders Bank Building; D. B. Coleman, F. A. D. Campbell and others to manufacture machinery, tools, electrical equipment, etc.

Verdun, Que., will call for bids shortly for repairs and additions to the waterworks and electric plants to cost \$50,000. George A. Ward is clerk.

The Imperial Oil Co., 56 Church Street, Toronto, has had plans prepared for a pump house at Hamilton, to cost \$5000 and boiler house to cost \$10,000.

The Gananoque Spring & Axle Co., Gananoque, Ont., is rebuilding its axle-hammer shop recently destroyed by fire.

Plans and specifications are being prepared for the erection of a plant on a site of 2½ acres on Granville Island, Vancouver, B. C., for the Canadian Metals & Equipment Co.

The Fraser Valley Shipbuilding Co., Vancouver, B. C., has decided to build a new plant there.

The Leonard Tractor Co. of Canada, Ltd., Montreal, has

been incorporated with a capital stock of \$1,000,000 by Waldo W. Skinner, William G. Pugsley, George G. Hyde and others to manufacture farm tractors, motors, machinery, tools, etc.

The J. B. Watson Furniture Co., Ltd., Kincardine, Ont., has been incorporated with a capital stock of \$50,000 by James B. Watson, Kincardine, Ont.; William J. Rooney, Toronto, Alexander W. Tolmie, Ottawa, and others to manufacture furniture and articles in which wood or steel is used.

Leclaire & Fils, Sorel, Que., have received a contract for the construction of six steel ships, costing \$1,500,000 and are in the market for tools and other equipment. F. Bridges is interested.

Three Rivers, Que., is asking for prices on a 3000-gal. centrifugal pump, split case, one stage, also one 200 hp., gasoline engine.

The E. B. Shuttleworth Chemical Co., 19 Dundas Street East, Toronto, is in the market for 2 to 5 hp., direct current electric motors, 25 cycle, single phase.

Fredericton, N. B., will install new waterworks pumps. George McKnight is engineer.

The Southern Canada Power Co., Coristine Building, Montreal, is in the market for a 150-kw. and a 300-kw. motor generator set, second-hand, the generator end 250 volts direct current, motor end three-phase, 60-cycle, 220 volts, synchronous motor, or separate machines of identical capacities and characteristics. L. C. Haskell is purchasing agent.

## Government Purchases

WASHINGTON, March 4.

Bids were received by the Bureau of Supplies and Accounts, Navy Department, Washington, Feb. 21, for furnishing material for the naval service:

### Schedule 3108½, Ordnance

Class 21, Washington—Three steam drop hammers—Bid 4, \$46,050; 30, \$46,100; 63, \$43,031 and \$45,521.

Class 22, Washington—One trimming press, motor driven—Bid 63, \$12,810; 37, \$9,535.

### Schedule 3220½, Construction and Repair

Class 111, Philadelphia—Five vertical shapers—Bid A, with electrical equipment—Bid 6, \$418.35; 34, \$564.75; 35, \$800; 63, \$467 and \$370; 68, \$460; 87, \$440; 105, \$1,190.40.

Bid B, without electrical equipment—Bid 6, \$332.35; 34, \$456.25; 68, \$365; 75, \$400; 87, \$240; 89, \$288; 105, \$894.

Class 112, Philadelphia—One hand planer and joiner—Bid A, with electrical equipment—Bid 6, \$565; 34, \$810.65 and \$654.13; 63, \$503 and \$387; 68, \$520, \$465 and \$470; 87, \$555; 104, \$576.

Bid B, without electrical equipment—Bid 6, \$466; 34, \$668.15 and \$511.63; 68, \$345 and \$350; 75, \$455; 87, \$296; 89, \$390 and \$375; 104, \$425.

The following bids were received by the purchasing officer, General Engineer Depot, War Department, Washington, Feb. 21:

Proposal 687, item 265, one upright drilling machine to drill to the center of a 32-in. circle—Bid 63, \$269 and \$350; 68, \$582; alternate, \$743, attachments, 98; 87, \$954, alternate, \$1,108; 32, \$738.40, d.-c. motor, \$22 extra; 36, \$658, without motors; 12, \$955 and \$961, arranged for geared-motor drive; 1, \$1,649, without motors; 20, \$570, alternate, \$740; 17, \$856.75, without motors.

Item 266, eight upright drills for 24-in. circle—Bid 63, \$244 and \$325; 68, \$371, alternate, \$499; 31, \$494.35; 87, \$415, alternate, \$536; 32, \$376.30, d.-c. motor, \$46 extra; 36, \$399, without motors; 1, \$772, without motors; 20, \$370, alternate, \$505; 17, \$509.45, without motors.

Item 267, four sensitive drills, floor type—Bid 63, \$115 and \$196; 68, \$136; 87, \$207 and \$279; 32, \$280.25, d.-c. motor, \$69 extra; 33, \$61.25; 36, \$136, without motors; 38, \$151; 1, \$208, without motors.

Item 268, one radial drill, 6-ft. swing—Bid 63, \$4,610 and \$4,608; 87, \$4,065, alternate, \$4,365; 1, \$4,531, without motors; 20, \$4,110, alternate, \$4,410.

Item 269 four radial drills, 4-ft. swing—Bid 63, \$3,121, with motor, and \$2,960, without motor; 68, \$2,565, alternate, \$2,761; 1, \$2,998, without motors; 20, \$2,200, alternate, \$2,535.

Proposal 683—Three key seaters, equipped for motor drive, but without motor; alternate proposal to include motor—Bid 29, \$1,210 each; 68, \$285 each; 1, \$105 each; 12, \$355; 3, \$910, alternate, \$1,010; 7, \$105, alternate, \$140; 63, \$658.

Proposal 685—Three watchmakers' precision lathes—Bid 29, \$55.92 each; chucks, \$2.16 each; alternate, \$76.80; motor, \$26.40; 68, \$800; 1, \$814; 12, \$765; 21, \$812; 18, \$551.80.

Proposal 680—Four universal milling machines—Bid 11, \$2,670 each; 14, \$2,960 each; 5, \$2,065; 1, \$3,725; 17, \$2,915 and \$2,832.

Proposal 681—Under item 571, three 21-in. x 10-ft. screw-cutting engine lathes; item 572, four 18-in. x 10-ft. identical lathes; item 573, 15 10-in. x 6-ft. similar lathes—Bid 29, item 572, \$1,166; 16, item 571, \$1,449; 572, \$1,278; 573, \$846; alternate \$982; 2, item 571, \$3,024, alternate \$2,652; 572, \$2,650, alternate \$2,267; 63, item 571, \$2,704, alternate \$2,978; 572, \$2,040, alternate \$2,232; 573, \$1,317, alternate \$1,571; 1, item 571, \$1,955.38; 572, \$1,737; 573, \$575; 20, item 571, \$2,650, \$2,255 and \$2,305; 572, \$2,310, \$1,222 and \$1,962; 10, item 572, \$1,230; 19, item 571, \$1,962; 572, \$1,682; 68, item 572, \$1,629, alternate \$930; 573, \$465, alternate \$870; 17, item 571, \$1,532; 572, \$1,468; 8, item 573, \$7,320; 9, item 572, \$8,319.20 and \$7,119.20; 127, item 572, \$2,086; extras, \$637.50 and \$1,518; extras, \$475.20; 23, item 573, \$870 and \$930 for d.-c. motor instead of a.-c. motor; 25, item 571, \$2,326; 572, \$2,263; 24, item 573, \$435, \$515, \$535 and \$615; 15, item 571, \$2,201; 572, \$1,870; 27, item 571, \$1,900; 572, \$1,825.

Proposal 684—Four double-head variable-speed planers—63, \$5,075 for 36 x 36 x 12 size; 28, \$5,216; 1, \$4,559.84 and \$3,819.93; 25, \$3,539 (alternate \$3,025) for 24 x 24 x 10, \$3,836 (alternate \$3,322) for 26 x 26 x 10, \$4,639 (alternate \$4,125) for 30 x 30 x 10, and \$5,100 (alternate \$4,587) for 30 x 42 x 10; 20, \$4,825, \$5,490 and \$7,130, motor included; \$4,140, \$4,680 and \$6,185, without motor and electrical equipment.

Proposal 686—Plate-bending rolls—22, \$3,350; 29, \$2,160; 26, \$4,000; 13, \$4,400; 68, \$2,925; motor, \$546; 17, \$2,070; 20, \$3,750; alternate \$4,900, motor and electrical equipment included; \$3,430, alternate \$4,580, exclusive of motor and electrical equipment; 27, \$3,041, without motor.

The names of the bidders and the numbers under which they are designated in the above lists are as follows:

Bid 1, Allied Machinery Co. of America; 2, American Tool Works Co.; 3, Baker Brothers; 4, American Lumber & Mfg. Co.; 5, Brown & Sharpe Mfg. Co.; 6, American Woodworking Machinery Co.; 7, J. T. Burr & Son; 8, Carroll-Jamieson Machine Tool Co.; 9, Champion Tool Works; 10, Cincinnati Lathe & Tool Co.; 11, Cincinnati Milling Machine Co.; 12, W. F. Davis Machine Tool Co.; 13, Hilles & Jones Co.; 14, Kearney & Tucker Co.; 15, Lodge & Shipley Machine Tool Co.; 16, Monarch Machine Tool Co.; 17, Monarch Machinery Co.; 18, Mosley Lathe Co.; 19, National Lathe Co.; 20, Niles-Bement-Pond Co.; 21, Rivet Lathe & Grinder Co.; 22, Joseph T. Ryerson & Son; 23, Sebastian Lathe Co.; 24, Shepard Lathe Co.; 25, Whitcomb-Blaisdell Machine Tool Co.; 26, George Whiting Co.; 27, Wickes Brothers; 28, Young, Corley & Dolan, Inc.; 30, Erie Foundry Co.; 31, Richards Machine Co.; 32, Superior Machine Tool Co.; 33, Champion Blower & Forge Co.; 34, J. A. Fay & Egan Co.; 35, Fairbanks Co.; 36, Hofer Mfg. Co.; 37, C. C. Fouts Co.; 38, Francis Reed Co.; 63, Manning, Maxwell & Moore, Inc.; 68, D. Nast Machinery Co.; 75, C. O. Porter Machinery Co.; 87, Sherrett & Stoer Co.; 89, H. B. Smith Machine Co.; 104, P. B. Yates Machine Co.; 105, Advance Machinery Co.

## NEW TRADE PUBLICATIONS

**Gas Meters.**—Bacharach Industrial Instrument Co., 422 First Avenue, Pittsburgh. Catalog E. Describes briefly and illustrates the various methods employed for measuring gases, such as impact and Pitot tubes, nozzles and Venturi tubes, etc. In connection with this review it is pointed out that the differential pressures is the quantity measured by each of these devices. In the description of the Hydro instrument for measuring and recording the differential pressure emphasis is laid upon the fact that by varying the proportions of the instrument any desired magnification of the differential pressures can be obtained. Mention was made of the application of the Hydro volume meter to blast furnaces, coke ovens, gas producer plants, etc., as well as measuring the air used for ventilating mines.

**Iron and Steel Forgings.**—Union Switch & Signal Co., Swissvale, Pa. Bulletin No. 8. Lists the products of the company's forge department which include drop forgings for automobile, aircraft, railroad and general service. The equipment possessed by the company is tabulated and a number of illustrations of the different forgings are presented.

**Foundry Pans.**—American Clay Machinery Co., Bucyrus, Ohio. Catalog. Describes a line of foundry pans for preparing or reclaiming or for forming a combination mixture of green, core or facing sands such as are used in iron and steel foundries. The construction of the pans is gone into some length, and the text is supplemented by a number of illustrations of the different combinations that can be furnished. A condensed table of specifications of the five sizes of pans that are built and a partial list of users are included together with data on the size of the motors required for driving the different pans.